Rock Products

WHICH IS CONSOLIDATED WITH THE JOURNALS

CEMENT and ENGINEERING NEWS (Est. 1896) **CONCRETE PRODUCTS** (Est. 1918)

APR - 2 1937
PERIODICAL DIVISION

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

ROTARY KILNS

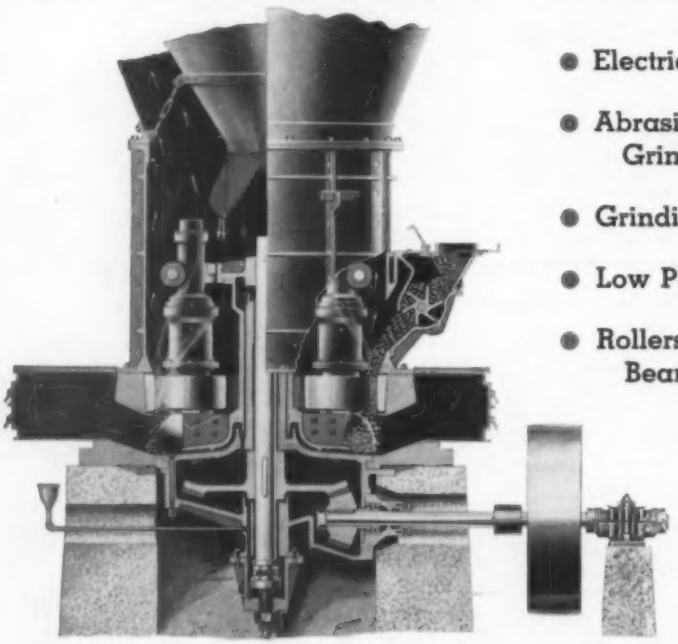
With integral Coolers, such as the UNAX cooler or the UNAX GRATE cooler

CEMENT MAKING MACHINERY
CEMENT PLANT ENGINEERING

F. L. SMIDTH & CO.

225 BROADWAY NEW YORK, N. Y.

REASONS WHY YOU SHOULD DO YOUR FINE GRINDING WITH WILLIAMS ROLLER MILLS



- Electric Steel Castings In Journals and Spider
- Abrasion Resistant Metals—Assure Long Life of Grinding Parts
- Grinding Parts Retain Original Shape Longer
- Low Power Consumption
- Rollers and Main Spindle Operate On Ball Bearings
- Big Door Provides Easy Entry to Mill
- Positive Automatic Feed Control
- More Efficient Air Separators
- Dry and Grind Simultaneously

Williams Improved Roller Mills with Air Separation are the most economical and practical for extremely fine grinding. Due to their large output on extremely fine work, it is now possible to produce a superior product at the same cost at which coarser grinds have been produced heretofore. Fineness is instantly changeable from 70% 100 mesh to 99.9% 325 mesh.

Williams offers the greatest advance in fine grinding machinery that the industry has seen in many years. Let us submit facts and figures on the proper size machine for your work.

. . . Write for more descriptive bulletins . . .

Williams Roller Mill with Super Separator

The Williams Patent Crusher & Pulverizer Co.
800 St. Louis Avenue • ST. LOUIS, MO.

Sales Agencies in All Principal Cities Including

Chicago	New York	San Francisco
37 W. Van Buren St.	15 Park Row	326 Rialto Bldg.

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. TRADE MARK REG. U.S. PAT. OFF.

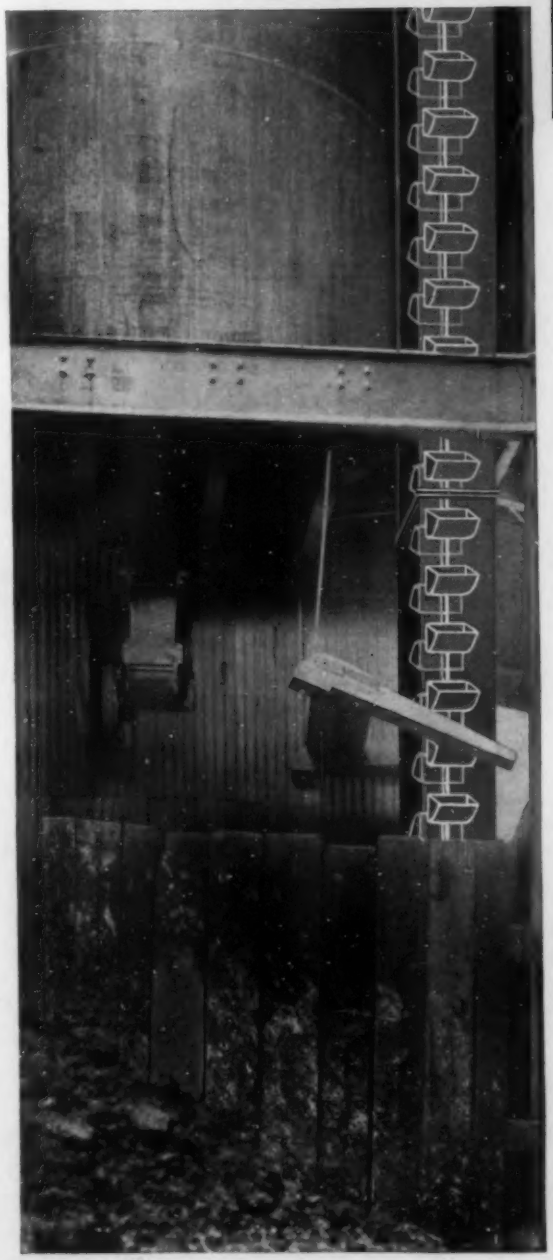
Williams

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

PATENT CRUSHERS GRINDERS SHREDDERS

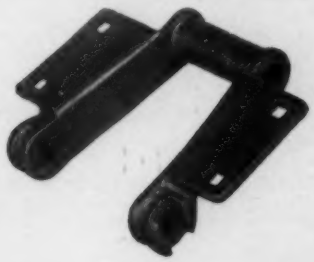
Receives four times more Service from

LINK-BELT *Promal* CHAIN



● This bucket elevator handles hot Fullers earth at the plant of the Fullers Earth Co., Midway, Fla. The service is extremely severe, the material being very abrasive. The No. 710 malleable chain, with which it was formerly equipped, usually had to be replaced about every 12 months.

In 1931 the elevator was equipped with Link-Belt Promal chain. Now, after over five years' service, an inspection showed little wear. The



indications are that this Promal chain will last at least another year.

For real economy, long life and dependability, try Link-Belt Promal chain and buckets on your severe service conveyors and elevators. Send

for Promal Chain Book No. 1050-A. Address Link-Belt Company, Indianapolis, Chicago, Philadelphia, Atlanta, San Francisco, or Toronto. Offices located in principal cities. 5834

Rock Products

Which is consolidated with the journals

CEMENT and ENGINEERING NEWS CONCRETE PRODUCTS

Founded 1896 Est. 1918

Entered as second-class matter, Jan. 20, 1926, at the Chicago, Ill., postoffice, under the Act of March 3, 1879. Copyrighted, 1937, by Tradepress Publishing Corporation

(PUBLISHED MONTHLY)

RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD

March, 1937

TABLE OF CONTENTS

Orders Follow the Flood 43

River Plants Recovering from Flood Disaster 44-47
Greatest Losses to Stockpiles and Electrical Equipment.
By Bror Nordberg

National Conference on Silicosis Hears Committee Reports 48-49

Bringing Old Cement Plant Up to Date 50-53
Superior Cement Corp., Portsmouth, Ohio, Improves Operating Efficiency Without Extensive Rebuilding

Unusual Features of Glacier Gravel Co. Plant Near Tacoma, Wash., Make It Almost Unique 54-57
By Edmund Shaw

Sand-Lime Brick Industry Tending Toward Stability and Quality Product 58-60

Opening a New Quarry 61-63
Canada Crushed Stone Co. Has Longer But Still Economical Haul.
By Bror Nordberg

Inter-Relationship Between Physical Characteristics of Concrete Aggregates 64-65
By J. C. Sprague

Relation Between Time Required for Complete Calcination Temperature and Size of Stone 72-73
By Victor J. Azbe

A. I. M. E. Engineers Discuss Matters of Interest to Rock Products Producers 74-77

"What's On the Worker's Mind Today?" 78-82
By Whiting Williams

Sand and Gravel Merchandised in the Form of High Grade Concrete Products 85-89
Sale of Washed Aggregates of Secondary Importance to Marietta Concrete Corp.

Pozzolan Cements Come Into Prominence—Discussed at Meeting of American Concrete Institute 89-90

Merchandising Concrete Products—Part 4 91-92
By Harold O. Hayes

Departments

Editorial Comments 43

Chemists' Corner 64-65

Hints and Helps 66-67

Financial News and Comment 68-69

Traffic and Transportation 70-71

Lime Producers' Forum 72-73

Concrete and Cement Products 83-95

New Machinery and Equipment 96-97

News of the Industry 98-100

Classified Directory of Advertisers 108, 110, 112, 114

Chicago Telephone Central 0670

New York Telephone Murray Hill 2-3005

TRADEPRESS PUBLISHING CORP.

205 West Wacker Drive, Chicago, Illinois, U. S. A.

NATHAN C. ROCKWOOD, President; J. L. FRAZIER, Secretary

NATHAN C. ROCKWOOD, *Editor*

BROR NORDBERG, *Associate Editor*

Contributing Editors

DR. F. O. ANDEREGG, Newark, Ohio

VICTOR J. AZBE, St. Louis, Mo.

GEO. D. ROALFE, Los Angeles, Calif.

RAY KEATS, *Assistant Editor*

L. V. RODDA, *Circulation Manager*

GEORGE C. WILLIAMS, *General Manager*

GEORGE M. EARNSHAW, *Eastern Manager*
56 W. 45th St., New York City
Tel. Murray Hill 2-3006
850 Euclid Ave., Cleveland, O.
Tel. Cherry 4050

LOUIS C. THAON, *Western Representative*
Chicago. Tel. Central 0670

JOS. J. KOLAR, *Copy and Research Manager*

INDEX OF ADVERTISERS

Allen Sherman Hoff Co..128
Allis Chalmers Mfg. Co.... 18
American Cable Co.... ....Third Cover
American Pulverizer Co..119
American Steel & Wire Co. 23
Artisian Mold Wks..... 93
Athey Truss Wheel Co.... 37
Atlas Powder Co..... 12
Audubon Wire Cloth Corp. 124
Austin Western Road Machinery Co. 41

Babcock & Wilcox Co....128
Earle C. Bacon Co., Inc.. 98
O. C. Bartlett & Snow Co.126
Besser Mfg. Co..... 95
Birdsboro Steel Foundry & Machine Co. 117
Blaw-Knox Company.... 36
Bonnot Company.....112
Bradley Pulverizer Co....121
Broderick & Bascom Rope Co. 16
C. G. Buchanan Co.....117
Bucyrus-Erie Co..... .....Fourth Cover
Byers Machine Company.101

Carnegie Illinois Steel Co.105
Cement Process Co.....121
Chain Belt Co..... 25
Chicago Bridge & Iron Works 99
Chicago Perforating Co..128
Classified Advertisements 123, 125, 127, 129
Classified Directory of Advertisers 108, 110, 111, 112, 113, 114
Cleveland Wire Cloth Co..124
Combustion Engineering Co., Inc. 22
Commercial Shearing & Stamping Co. 94
Cross Engineering Company 115
Curtis Pneumatic Machinery Co. 113

Dempster Bros., Inc.....122
Dixie Machinery Co.....124
The Dorr Company..... 40
E. I. du Pont de Nemours & Co. 11

Eagle Iron Works.....110
Easton Car & Construction Co. 121
J. B. Ehrsam & Sons Mfg. Co. 118
Ensign-Bickford Co..... 24
Eureka Art Store Wks... 93

Flexible Steel Lacing Co..119
Frog Switch & Mfg. Co..128
Fuller Company 8

General Electric Company 20, 21, 115
Goodrich, B. F. Co.....3, 130
Good Roads Machinery Company 118
Gruendler Crusher & Pulv. Co. 124
Gulf Refining Co.....109

Haiss, Geo. Mfg. Co.....100
Hardinge Company.....111
Harnischfeger Corp. 103
Harrington & King Perf. Co. 122
Hayward Company 128
Hendrick Mfg. Co.....120
Hetherington & Berner, Inc. 126
Hewitt Rubber Company. 42
Huron Industries 118
Industrial Brownhoist 117, 119

Ingersoll-Rand 29

Jaeger Machine Co..... 5
Jeffrey Mfg. Co....38, 39, 126

Koehring Company..... 26

Leschen, A. & Sons Rope Co. 98
Lewistown Foundry & Machine Co. 124
Lima Locomotive Works.114
Lincoln Electric Co..... 31
Link Belt Company....1, 121
Ludlow-Saylor Wire Co. 33, 34

Macwhyte Company..... 13
Manganese Steel Forge Co. 124
Manhattan Rubber Company 15
Manitowoc Engineering Co. 30
Marietta Concrete Company 120
McLanahan & Stone Corp. 126
Mepham, Geo. S. Corp.... 93
Miles Mfg. Co..... 94
Morris Machine Co.....101
Multiplex Concrete Machy. Co. 94

New Holland Machine Co.120
Nordberg Mfg. Co.....104
Northwest Engineering Co. 32

Owen Bucket Co.....114

Page Engineering Co.....116
Pennsylvania Crusher Co.128
Portland Cement Ass'n... 84
Preformed Wire Rope.... 10
Productive Equipment Corp. 128

Raymond Bros. Impact. Pulv. Co. 22
Richardson Scale Co.....116
Robins Conveying Belt Co. 124
Roebling's, John A. Sons Co. 14
Ryerson, Jos. T. Sons, Inc. 121

Sauerman Bros., Inc.....120
Schaffer Poidometer Co..126
Simplicity Engineering Co. 122
Smidth, F. L. & Co..... .....First Cover
Smith Engineering Co.... 9
Sprout, Waldron & Co...128
Standard Pressed Steel Co. 27
Stearns Mfg. Co..... 94
Sterling Machinery Corp.100
Stultz-Sickles Co.....126
Sturtevant Mill Co..... 19
Syntron Company..... 93

Tamms Silica Co..... 93
Texas Company 4
Timken Roller Bearing Co. 6, 102
Traylor Engineering & Mfg. Co. 7
Tyler, W. S. Co.....126

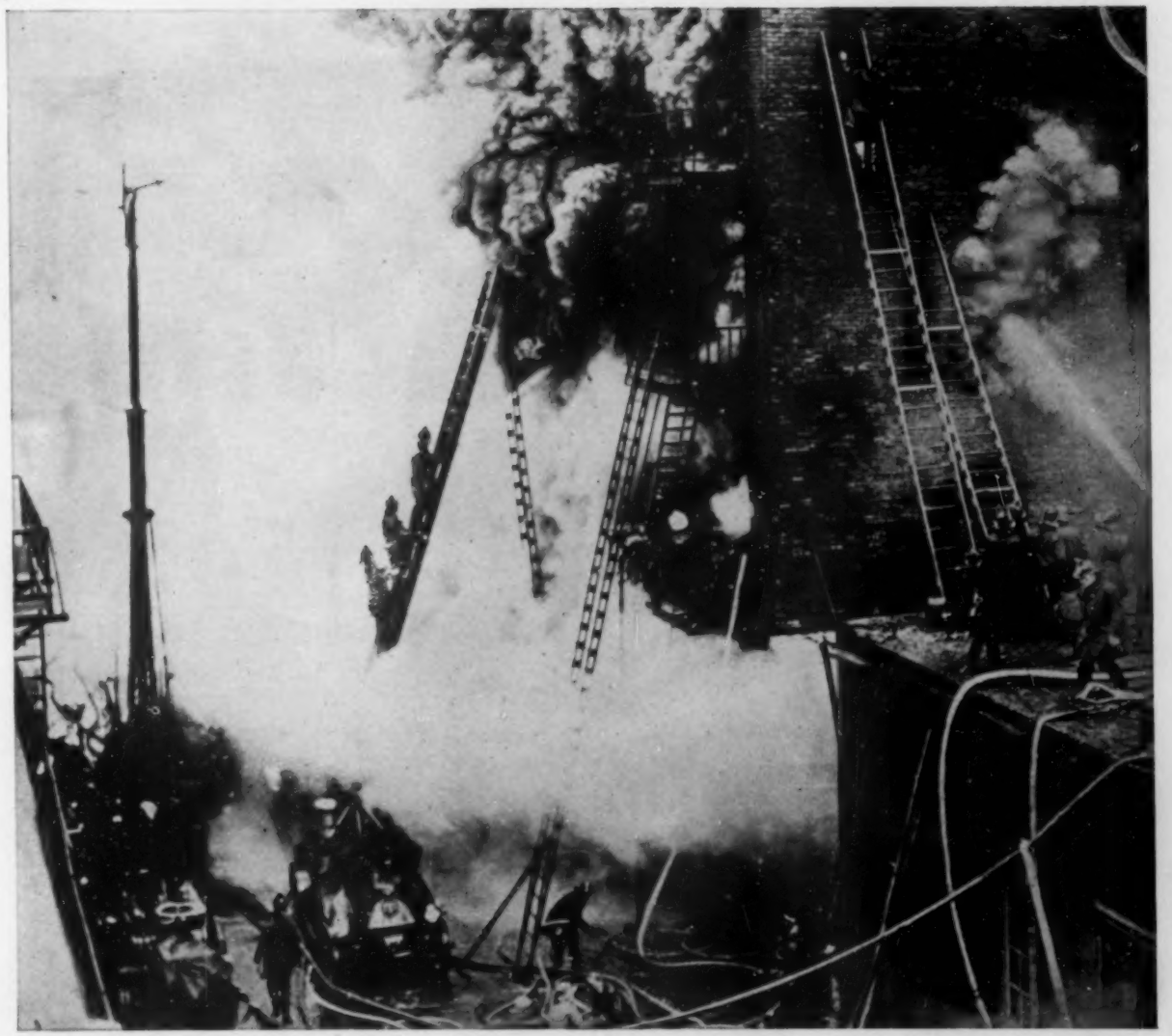
United States Steel Corp. Subsidiaries 23, 105
Universal Concrete Pipe Co. 124
Universal Road Machinery Co. 17
Universal Vibrating Screen Co. 119

Welch, F. M. Engineering Service 115
Wellman Engineering Co.122
Wickwire Spencer Steel Co. 35
Willfley, A. R. & Sons....122
Williams Patent Crusher & Pulv. Co...Second Cover
Williamsport Wire Rope Co. 28
Worthington Pump & Machy. Corp.....100

SUBSCRIPTION—Two dollars a year to United States and Possessions. $2.00 a year to Canada and $4.00 to foreign countries. Twenty-five cents for single copies.

The A. B. P. is a nonprofit organization whose members have pledged themselves to a working code of a practice in which the interests of the men of American industry, trade and professions are placed first—a code demanding unbiased editorial pages, classified and verified paid subscribers, and honest advertising of dependable products. The A. B. C. is an organization which audits and verifies publishers' circulation claims and records.

(Rock Products is indexed in the "Industrial Arts Index," which can be found in any Public Library)



WATER—OR SUDDEN DEATH

A typical example of Goodrich improvement in rubber

WHEN the four-alarm sirens scream, lives and millions depend on split-second action.

Count on the engines to be there in a flash. But in lugging heavy hose from hydrant to fire, and up into the burning building, vital time is lost.

Every hose manufacturer has tried to cut that time by making hose lighter, easier to handle—but the only way they could do it was to use less rubber or cotton jacket, and the result was such a loss in burst strength that the hose was not safe, or impractical because it weakened too soon.

Then Goodrich engineers went to work on the problem—the same engineers who doubled belt life with the raw-edge belt and Plylock Splice—who speeded construction with air hose that doesn't clog tools—who found how to attach rubber to steel and make modern acid handling possible—these engineers who have developed a thousand improvements for industry now set to work on fire hose.

First they invented a new kind of cotton cord of greater strength. They found a new rubber compound which in thinner gauge is as sturdy as previous rubber of greater thickness. Then they developed a method of weaving the cotton jacket, using more but smaller strands and twisting them the way ship cables are spun so that each strand carries its equal share of pressure.

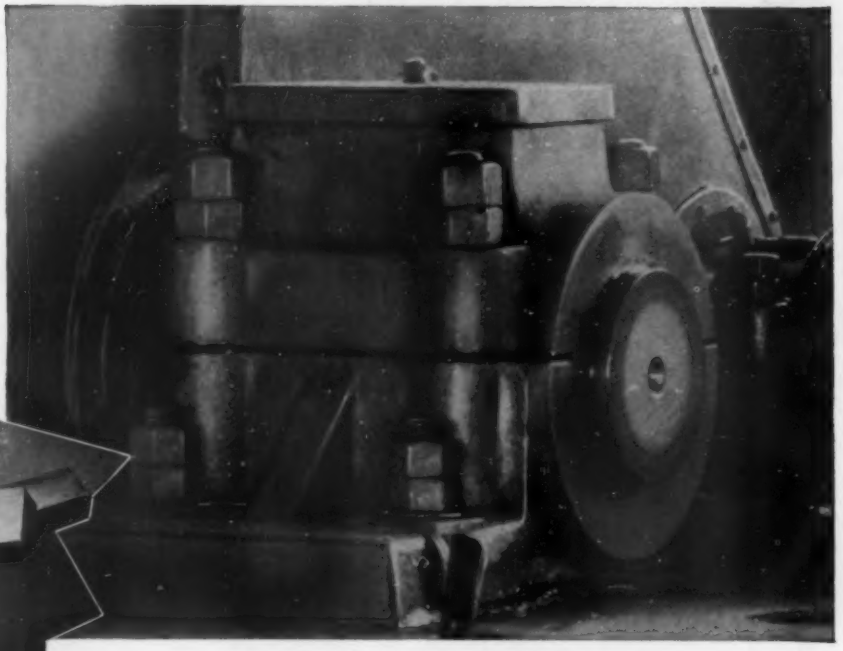
The result is Highflex Fire Hose—a hose equal in burst strength—equal in every way—to other hose, yet 18% lighter and easier to handle . . . a long step forward in the battle for life and property . . . another plus value for industry, added by Goodrich research. The B. F. Goodrich Co., Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *products problems* IN RUBBER

THIS *Stops* overheating

This is the "pyro-point" instrument with which the Texaco representative learns the skin temperature of each bearing, before specifying Taurak.



Taurak comes in 70-lb. fibre-board cartons, divided in handy slabs 2" x 4" x 12" individually wrapped in waxed paper.

IT'S solved. We mean the game of guessing just *why* one open-type bearing persists in overheating, while another runs cool.

Research engineers in Texaco laboratories have definitely proved that the skin temperature of a bearing must be known before a grease-type lubricant can be satisfactorily specified.

Today, Texaco men take pyrometric readings of each bearing so that the exact grade of Texaco Taurak can be ascertained.

Selected in this scientific way, Taurak eliminates overheating. It doesn't "drag out" of the bearing and waste away. It doesn't "glaze over" and fail to lubricate.

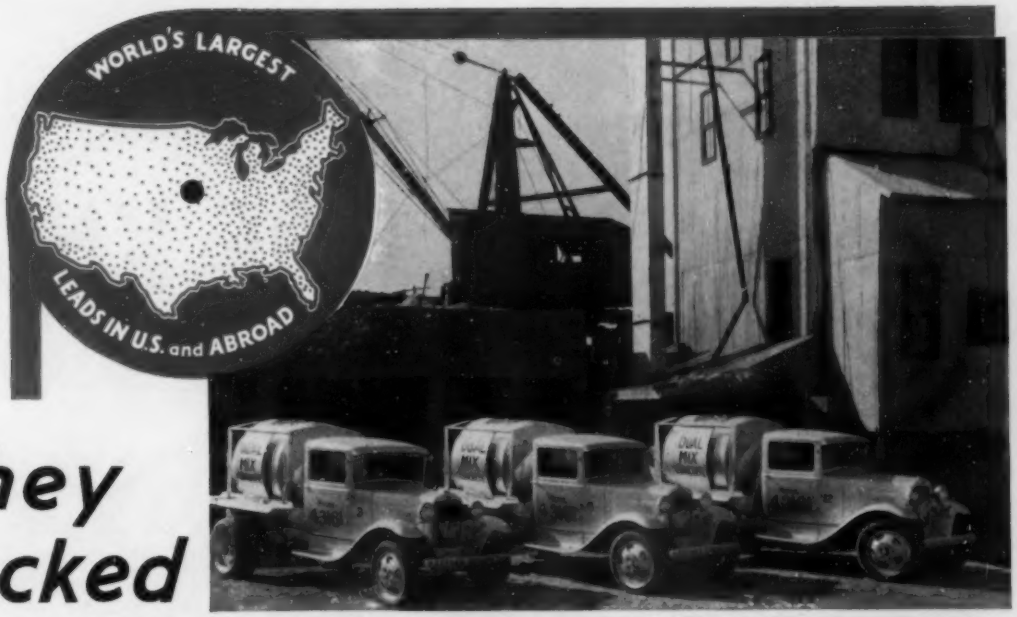
Try Taurak in bearings subjected to high external heat. You'll thank us for this tip.

A Texaco representative will gladly provide practical engineering service to prove the economies of Texaco Products.

THE TEXAS COMPANY
135 East 42nd Street, New York City
Nation-wide distribution facilities assure prompt delivery

TEXACO

TEXACO *Industrial Lubricants*



They Checked Up ··· AND BOUGHT JAEGERS

"After checking merits decided to buy two Jaeger 3-yd. Agitators. When more are purchased our choice will again be Jaegers."
HENRY BICKEL CO., Louisville, Ky.

"Our observation covering competitive mixers in Miami area reveals Jaegers are in a class by themselves. Our first installation of three was followed by 7 additional in three months."
W. M. DABNEY, INC.,
Miami Beach, Fla.

"Have operated other makes but my Jaegers fulfill all demands 100% for accurate performance and low operating cost."
FRED C. KNAUER,
Branchville, Md.

"Have had four Jaegers in past 4½ years—have given us exceptionally good service—get a wonderful mix and it takes less time than in other types we have rented. Maintenance costs have been very low. Have been averaging 100 cu. yds. of concrete per day for last 7 months. We recommend your Mixer to prospective buyers."
MARION COAL & SUPPLY CO.,
Pittsburgh, Pa.

"Since we bought our first Jaeger, nearly three years ago, we have been sold on it, as the machine, operated with competition, has been our best salesman. Economy, service and the way the machine does its job under all conditions led us to reorder two Jaegers."
TRANSIT MIXED CONCRETE CO., INC.
Washington, D. C.

"Before going into truck mixers," states KEEFNER CONCRETE & MATERIAL CO., Des Moines, Ia., "we thoroughly analyzed and investigated all competitive equipment. Our decision to purchase Jaegers has proven very wise for several reasons. First, an immediate increase in our business. Second, while parts needed have been negligible, it is a satisfaction to buy them from a dealer still in business. Third, it is a well balanced, most economical outfit to operate. Some of our mixers are on their third chassis. After observing other ready mixed operations in various parts, we feel our Jaegers give a more thorough mix, discharge is fast and continuous—without segregation. Fewer spaders and puddlers required. They are easy on trucks, surprisingly long tire life and mileage. Have our unqualified recommendation."

Plant after plant, both newcomers and veterans, are finding that the way to get the most customers and the most profit for their sand, stone and cement is to sell Jaeger HIGHER STRENGTH Concrete, mixed and delivered in Jaeger Dual-Mix Truck Mixers. When they check up they find that Jaeger End-to-End Mass Mixing and Smooth, Continuous Flow Discharge produce a stronger, more workable concrete preferred by both engineers and contractors. And they find that Jaeger features of speed, efficiency and low cost operation and maintenance give Jaeger operators a recognized advantage in serving this market PROFITABLY.

HIGH REAR LIFT ATTACHMENT—75% More Spouting Area!

Jaeger Service is Complete—Truck Mixers, Agitators, Bins, Batchers, Tipple Tanks—Get Our Catalog and Prices Before You Buy!

THE JAEGER MACHINE CO.
603 Dublin Avenue
Columbus, Ohio

World's Largest Makers of Concrete Mixing Equipment.

JAEGER TRUCK MIXERS

BUILT IN ½ - 1½ - 2 - 3 - 4 - 5 CU. YD. SIZES—END OR SIDE DISCHARGE

Ask the Driller

HE KNOWS

Any rock driller who has had experience with both will tell you that TIMKEN Bits have it over forged steel "like a tent"

After all, the driller ought to know what he is talking about. He is in the best possible position to appreciate the greater ease of handling, faster drilling and longer life of TIMKEN Bits. They enable him to get more good holes in a given time with less effort.

To the contractor these advantages mean radically reduced drilling costs — for all forging expense is eliminated; drill steel investment is sharply curtailed; and nipping charges are cut to the vanishing point.

The TIMKEN Bit is not a new or unproved device. It was introduced more than four years ago and has been displacing forged steel ever since. During this time the bit has been considerably improved in design and material although the basic principle remains the same. Today nothing can touch it for efficiency and economy.

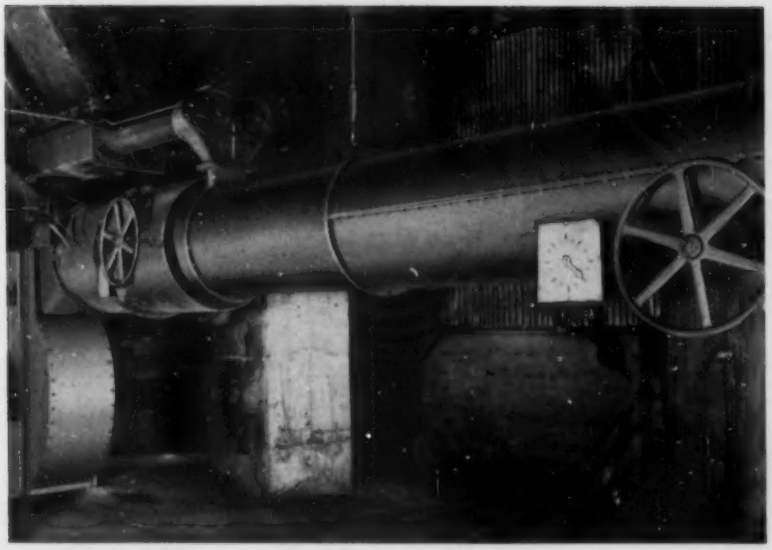
Isn't it time you were getting acquainted with TIMKEN Bit savings? Write for more information.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN BITS

Cut your fuel costs



WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

Welded or Riveted Stacks, Tanks and Bins for any purpose.

—with the TRAYLOR-CHEESMAN BURNER-COOLER SYSTEM

The Traylor-Cheesman Patented Burner is designed particularly to use all heated air recovered from a Cooler for the Kiln combustion. This heated air may have a temperature as high as 900° F., or even more, thus attaining a high degree of economy of combustion.

Results secured in a number of installations where Traylor-Cheesman Burners have been applied to existing kilns and connected with existing coolers show fuel economies ranging from 150,000 B.T.U. upward, per barrel of cement. The Burner is adapted for using pulverized coal, gas or fuel oil.

Full details in Bulletin No. 116

TRAYLOR ENGINEERING & MANUFACTURING CO.

ALLENTOWN, PENNSYLVANIA, U.S.A.

NEW YORK CITY 3916 Empire State Bldg. | CHICAGO 2151 One La Salle St. Bldg. | SALT LAKE CITY 101 West Second South St. | LOS ANGELES 919 Chester Williams Bldg. | SEATTLE 6311 22nd Ave., N. E.

Timmins, Ontario, Canada—P. O. Box 113

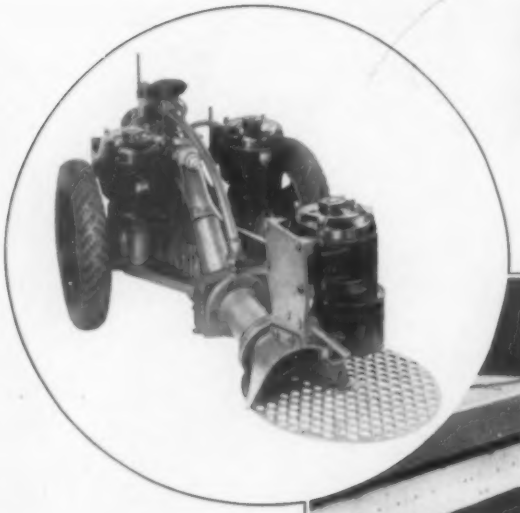
MANILA MACH. & SUPPLY CO. Manila and Baguio, P. I.

Robins Conveyors (So. Africa) Inc. Johannesburg, Transvaal, S. A.

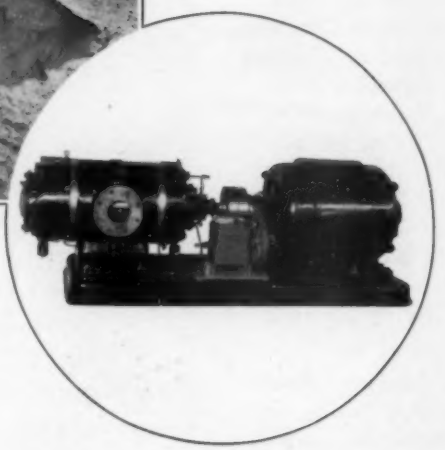
Export Department—104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Sao Paulo, Rio de Janeiro, Buenos Aires, Santiago, Valparaiso, Antofagasta, Iquique, Oruro

European Works—Usines Carels Freres, Ghent, Belgium

UNDIVIDED RESPONSIBILITY AT PEORIA



FULLER-KINYON UNLOADER
AND
FULLER ROTARY COMPRESSOR



All of the cement used in the construction of the Peoria Lock in the Illinois River (Great Lakes Dredge and Dock Co., contractors) is being handled by a Fuller-Kinyon Automatic Remote-Control Unloader, and the air for this Unloader is being supplied by a Fuller Rotary Compressor . . . equipment built by one manufacturer and sold under one contract . . . no division of responsibility for the satisfactory performance of the unit as a whole.

This represents an ideal installation . . . the most efficient and economical method for unloading and conveying Portland cement and many other pulverized materials.

Cement on this project is unloaded from barges, and conveyed to the mixing plant, *a distance of 413 feet.* The Unloader has a capacity of 115 barrels per hour through a 4" pipe line, and the Fuller Rotary Compressor supplies the necessary quantity of air at a required maximum of 35 lb. pressure.

We shall be glad to send you bulletins on both the Fuller-Kinyon Automatic Remote-Control Unloader, and the Fuller Rotary Compressor.

FULLER COMPANY

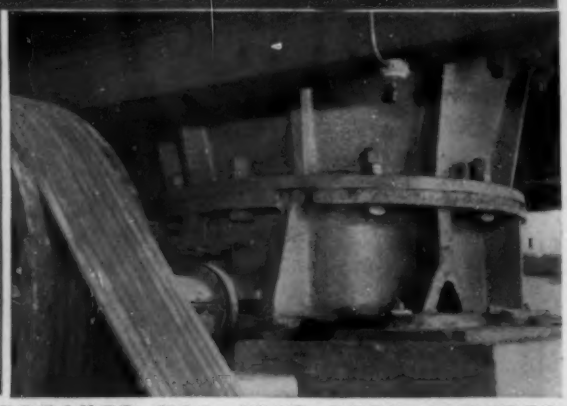
CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.

P-16

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · AUTOMATIC BATCH WEIGHERS · · · BIN SIGNALS

TELSMITH AT THE GRAND COULEE DAM



A SECOND No. 20 TELSMITH PRIMARY BREAKER HAS JUST BEEN ORDERED

In the million dollar aggregate plant of the M-W-A-K Co. at Grand Coulee Dam, a Telsmith Primary Breaker has been crushing all the oversize from the Brett pit—big, hard, 6 to 20 inch boulders. Operating to capacity for many months, it has set a remarkably successful record for both quantity and quality of output.

Development of the pit has shown the presence of more rock than anticipated. To further increase the production of aggregate, a second No. 20 Telsmith Primar Breakery has now been ordered; and will be installed next to the original crusher.

The short, compact structure, *steel* frame and *steel* crown give Telsmith super-stamina. Larger head and concave diameters, with greater receiving and crushing area, allow faster feeding. The unique *parallel pinch* guarantees bigger capacity. That's why Telsmith is the outstanding performer on hard rock—such a satisfactory equipment at Grand Coulee. Bulletin B-11 gives complete details. Write for it today.

BC-1-37

SMITH ENGINEERING WORKS, 3008 E. CAPITOL DRIVE, MILWAUKEE, WIS.

50 Church Street, New York City — 201 N. Wells, Chicago, Ill. — 1013 Commercial Trust Bldg., Philadelphia, Pa.
31 Binney St., Cambridge, Mass. — 413 Westinghouse Bldg., Pittsburgh, Pa. — Atkinson-Anderson Co., Detroit, Mich.
Associates in Canada: Canadian Ingersoll-Rand Co., Ltd.

TELSMITH

now . . .

Textiles

are

preshrunk

now . . .

Wire rope *is preformed!*

● The preforming of wire rope is the same type of basic improvement as the sanforizing of textiles. Preforming means that each wire and strand in wire rope is molded or shaped (*in advance*) to the exact helical curve each must assume in the completed rope.

Preforming tends to reduce internal stress or strain. And *that* is the reason why preformed wire rope lasts so much longer, gives so much better service.

There are at least a dozen ways in which preformed wire rope is superior. Ask us to send you a sample of preformed wire rope. Learn all the facts about its true superiority. For many wire rope applications, preformed rope will give you much greater dollar value.

PREFORMED

NON-PREFORMED

LICENSEES UNDER PREFORMED WIRE ROPE PATENTS

Educational Bureau • 520 North Michigan Avenue • Chicago, Illinois

Preformed WIRE ROPE

for SAFETY · ECONOMY · EFFICIENCY

QUARRY AFTER QUARRY IS SWINGING TO NITRAMON

Why? Because Nitramon gives lower cost per ton of rock moved . . . and is safer

DU PONT
REG. U. S. PAT. OFF.

E. I. DU PONT DE NEMOURS & COMPANY, INC., EXPLOSIVES DEPARTMENT, WILMINGTON, DEL.

NITRAMON
REG. U. S. PAT. OFF.
THE APPROVED BLASTING MATERIAL

If your shovel could sing

LET the theme song of your shovel be the song of money saved—of profits earned. There's real dollar-and-cents rhythm in the swing from dump to full when Atlas Apex *calls the tune!*

Shovels that "sing the blues" can put you in the *red!* But shovels speed up and fill up at every swing with the improved fragmentation that Apex action provides. For the action of Apex exerts just enough force—just fast enough—to spread its energy throughout the entire burden. The action of Apex produces vastly improved breakage!

Apex action is increasing shovel production and saving wear and tear on so many shovels in so many quarries that you ought to try it in your own. Let the Atlas representative arrange a demonstration. Apex action and the *music* of your shovel will prove more convincing than any number of *words!*

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Joplin, Mo.	New Orleans, La.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Kansas City, Mo.	New York, N. Y.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Knoxville, Tenn.	Philadelphia, Pa.	Salt Lake City, Utah	Tamaqua, Pa.
Denver, Colo.	Los Angeles, Calif.	Picher, Okla.	San Francisco, Calif.	Wilkes-Barre, Pa.
Houghton, Mich.	Memphis, Tenn.	Pittsburg, Kansas	Seattle, Wash.	

ATLAS

EXPLOSIVES

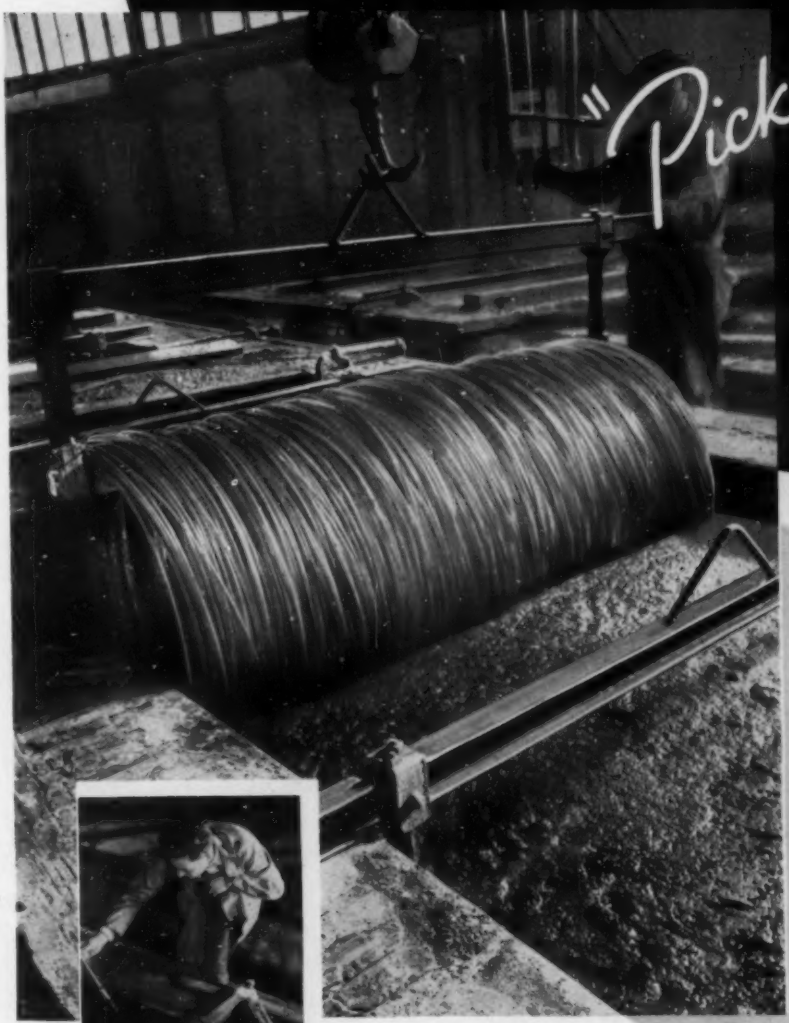
CHEMICALS ATLAS EXPLOSIVES

MACWHYTE

PRE *formed* WIRE ROPE

INTERNALLY LUBRICATED

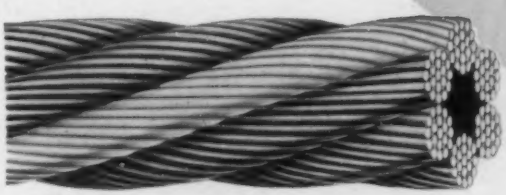
"Pickling"... an important step in the making of tough, strong wire rope



Twice a day this experienced Macwhyte chemist tests the acid bath to assure uniform "pickling."

● All the wire used in Macwhyte PREformed Wire Rope is made in our own wire mill. Careful attention is given to every step in the processing of this wire. High quality — not heavy tonnage — is the aim of our wire specialists. The "pickling" operation you see pictured here is extremely important. Immersing the wire as it comes from the heat treating furnaces in these acid baths removes impurities which might cause premature failure of the finished rope. Strict control assures the greatest uniformity in each coil of wire. This is one of the many reasons why Macwhyte PREformed Wire Rope gives such good service out in the field.

● Monarch WHYTE STRAND PREformed Wire Rope ... specially designed for jobs where ropes must stand up under severe bending. Macwhyte manufactures special constructions for shovels, draglines, cableway excavators, scrapers, loaders, mixers, pavers, incline hoists. Macwhyte also makes specially designed non-preformed wire ropes.

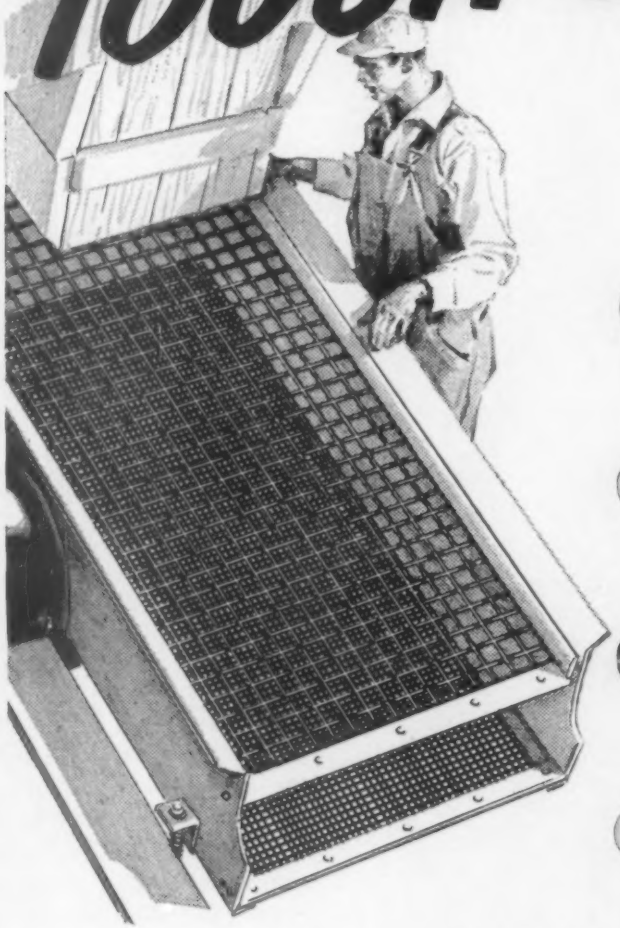


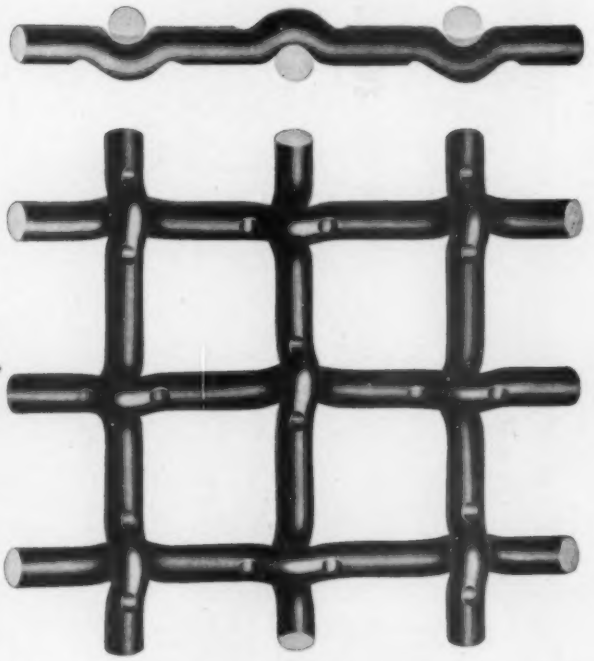
MACWHYTE COMPANY, *Kenosha, Wisconsin*

Manufacturers of wire rope and braided wire rope slings

Distributors and stock throughout the U. S. A. for quick service

HOW MUCH TOUGH GOING DOES YOUR SCREENING STAND?





SCREEN WEAR is a tough adversary. Only wire screens with strength and stamina to spare can make a real showing in the rough and tumble of screening operations.

The strength of a wire screen and its ability to resist vibration and abrasion must both be inherent qualities of the wire itself. Logically then, a screen is as good as the wire of which it is made.

For 90 years, Roebling has been making wire for countless severe service purposes from light but tough wire aircraft cords to giant bridge cables. And for half a century, it has been making wire fabric.

Let us put this long experience to work for you in your fight against screen wear or vibration. Roebling Wire Screens are made in many types and metals for sizing, cleaning and grading work.

ROEBLING *Wire Screen*

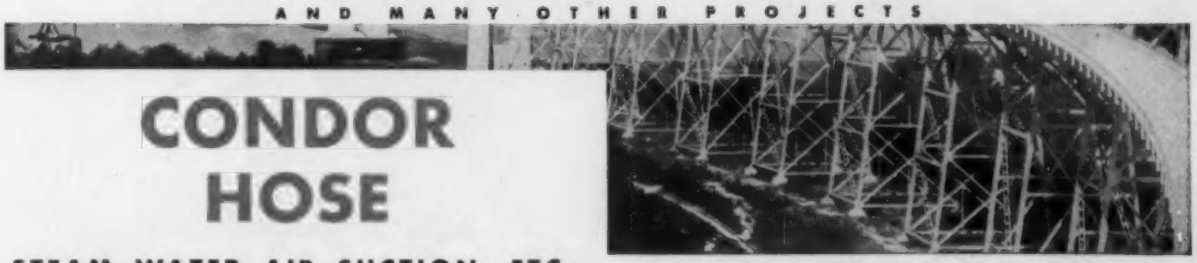
TRADE JERSEY MARK

90 YEARS OF WIRE MAKING SPELLS THE DIFFERENCE

FOR THIS GIGANTIC

MISSISSIPPI BRIDGE

AND MANY OTHER PROJECTS



CONDOR HOSE

STEAM—WATER—AIR—SUCTION, ETC.

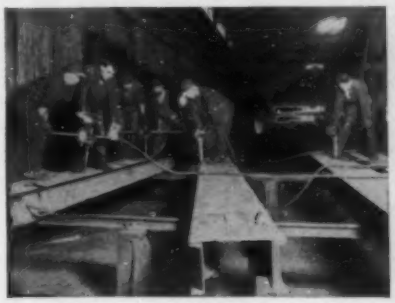
This 4⅛ mile bridge, the longest of its kind in the world, is only one of many projects in whose construction Manhattan Hose of all types is used. The other illustrations on this page suggest additional typical applications where Manhattan Hose has proved its dependability and long life.

For more than 43 years Manhattan engineers have studied the specific hose requirements of all types of industry.

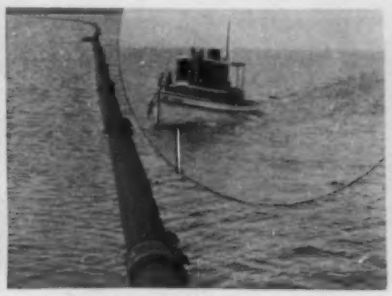
More than 6,000 ft. of Manhattan Steam, Water, Air, Suction and Hydraulic Hose and many Dredge Sleeves were used in the construction of this 4⅛ mile, longest-of-its-type bridge spanning the Mississippi at New Orleans.

This experience and unexcelled manufacturing facilities insure users of Manhattan Hose of a product exactly suited for their individual requirements.

For low ultimate hose cost in severe service, specify Condor Brand Hose.



Condor Air Hose — in use in a steel mill.



90 Condor Dredge Sleeves in a 2600 ft. pontoon line, being towed 28 miles.

Large Condor Sand Suction Hose—33" in diameter, 14' long, 12-ply.

Condor PRODUCTS

Conveyor Belt	Air Hose	Rubber Lined Tanks
Transmission Belt	Contractors Hose	Rubber Covered Rolls
V-Belt	Sand Blast Hose	Chute Lining
Hydraulic Hose	Suction Hose	Launder Lining
Steam Hose	Fire Hose	Industrial Brake Blocks
Water Hose	Molded Rubber Goods	Rubber Bonded Abrasive Wheels

Write for new General Catalog

Condor Air Hose on a large government construction project.

SOLD BY LEADING JOBBERS

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.

EXECUTIVE OFFICES AND FACTORIES, 6 TOWNSEND ST., PASSAIC, N. J.

Tough Rope for Tough Jobs

"Flex-Set" Preformed Yellow Strand is especially recommended for hoist line, crowd rope, rack rope and swinging lines on power shovels; for dragline and hoist line on dragline machines; for holding line and closing line on clam shell buckets.

Almost any wire rope will serve well enough in some places—but where the going is rough—*and tough*, there "Flex-Set" Preformed Yellow Strand shows its super-quality—its unquestioned ability to *"take it,"* and *"like it."*

This is the same Yellow Strand that has been "taking it" successfully for many years—the same specially drawn wire, tested and selected—the same careful manufacture by the same company that is now *61 years young*.

The difference results from preforming, which sets the strands to the helical form they maintain permanently in the finished rope. Thus "Flex-Set" Preformed Yellow Strand is largely pre-broken in. It is limp—easy to handle and install—highly resistant to kinking, fatigue and wear.

With these properties, how could it be other than economical? Try it!

BRODERICK & BASCOM ROPE CO., St. Louis

Branches: New York, Chicago, Seattle, Portland, Houston; Factories: St. Louis, Seattle, Peoria

U-9

"Flex-Set" Preformed YELLOW STRAND

THE GAYCO

CENTRIFUGAL AIR SEPARATORS

A decided advancement in air separator practice embodying features based on many years' experience in the designing of this type of equipment.

The exclusive patented GAYCO feature of rejecting the coarse particles by means of a centrifugal sizing fan alone warrants the installation of the new GAYCO.

The new GAYCO Centrifugal Air Separator gives operators higher efficiencies and added economies in the classification of non-metallic materials at lowest maintenance cost and assures absolute uniformity of product.

The new GAYCO will separate practically all dry fine materials and many that are too sticky to be screened. No change in pulley speed necessary.

The new GAYCO Centrifugal Air Separator is available in seven sizes up to 16 feet diameter, including a 30 inch size for laboratory use and pilot plants.

Universal Road Machinery Co.

MAIN OFFICE AND FACTORY
KINGSTON, N. Y.

LABORATORY
KINGSTON, N. Y.

GAYCO

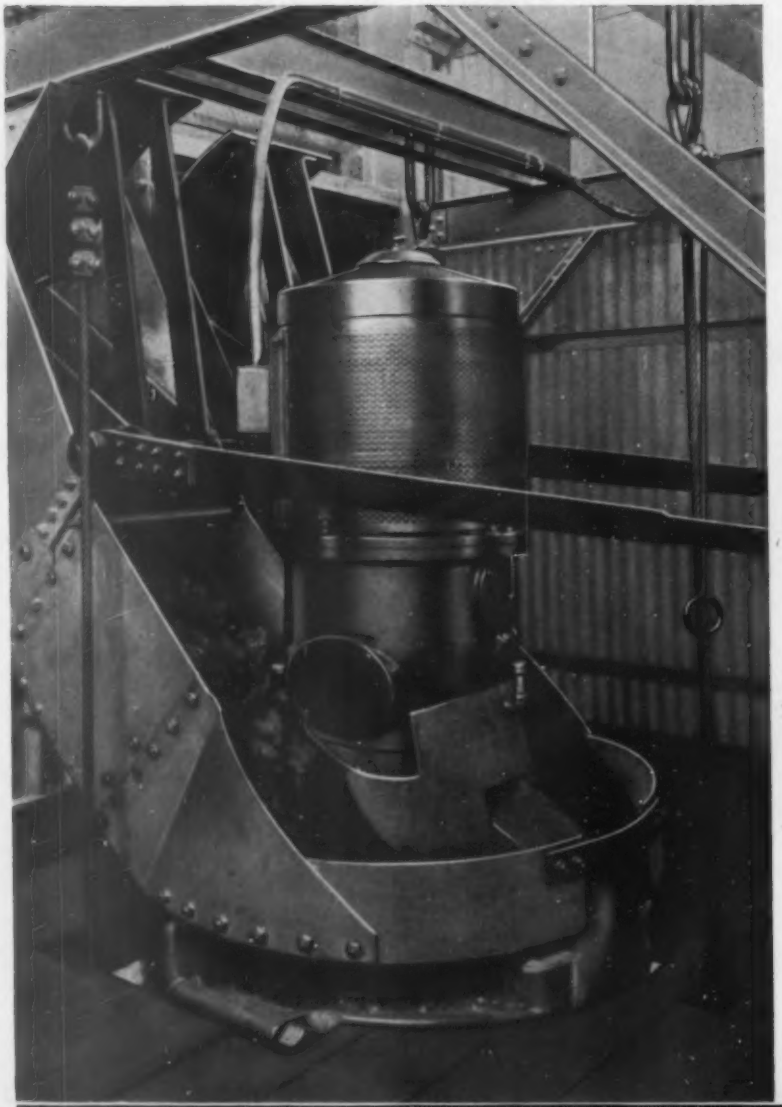
RUBERT M. GAY - DIVISION
114 LIBERTY STREET
NEW YORK, N. Y., U. S. A.

GAYCO

"GAYCO" CENTRIFUGAL SEPARATORS

"RELIANCE" CRUSHING, SCREENING AND WASHING EQUIPMENT

Proven
BY EVERY TEST



A PROMINENT Ohio commercial stone plant made the following tests on an Allis-Chalmers Newhouse Crusher, to prove to their own satisfaction that they had selected the best crusher for their job.

A test, which was of long duration was made on a 10″ Newhouse Crusher driven by a 125 hp, 495 rpm motor. The setting was 9/16″ on the close side with a ½″ throw eccentric. The maximum power input to the motor was 100 hp.

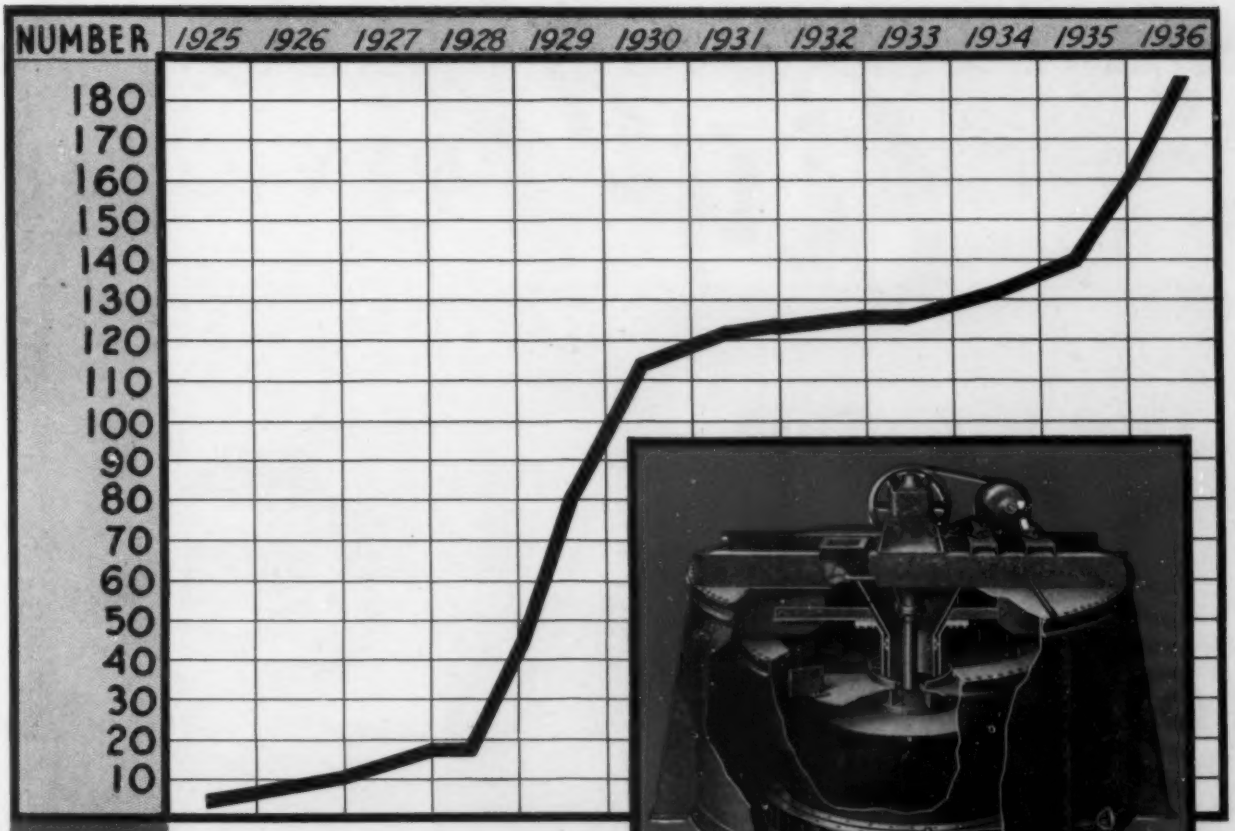
All of the material crushed was passed over two 4′x8′ vibrating screens, set in tandem, with ½″ square openings. This gave a product through this ½″ screen cloth and washed over an ⅛″ square wire which averaged 43 tons an hour for duration of test. This material discharged into a bin by itself and was weighed. The oversize and throughs averaged about an equal amount. This would bring the total material handled to approximately 86 tons an hour.

The feed to the crusher during the test was minus 5″ plus 2″. The product discharged from the 10″ Newhouse contained over 98% of material minus 1″ and only 6% of fines—⅛″ indicating very little dust.

EQUIPMENT ENGINEERS TO INDUSTRY

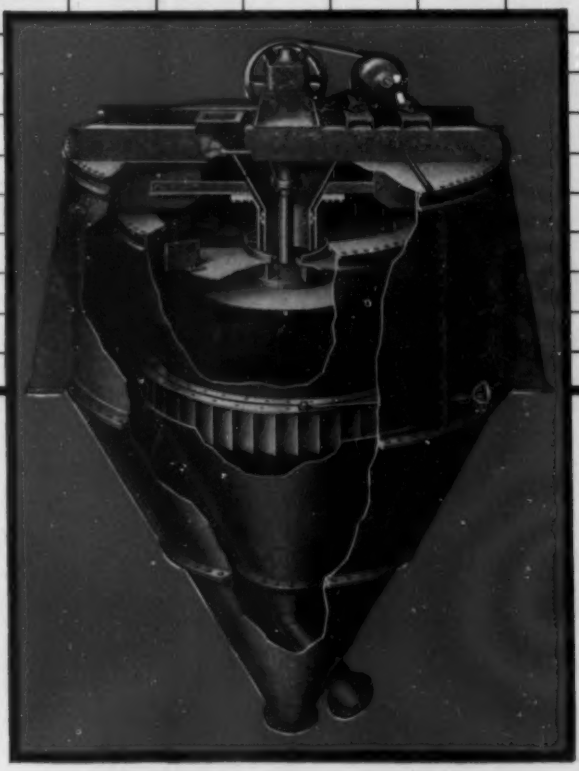
ALLIS·CHALMERS

MILWAUKEE WISCONSIN



STURTEVANT

a survey of the introduction of Air Separators into Cement Plants is interesting



This chart taken from Sturtevant Mill Co's. sales sheets to Dec. 31, 1936, shows the start to have been about 1925-1926.

In 1927-1928 much interest was shown with rapidly growing appreciation of all that Air Separation would mean to the Cement Plant, until, in 1929-30, one hundred eighteen Sturtevants had been sold.

Then came the depression years of 1931-1933 but in 1934 operators realizing that Sturtevant Air Separators were standard for "High Early" and that they would be assured of Specific Surface Area—Particle Size Control—Lower Temperature—Lower Production Costs with Increased Tonnages again placed orders for prompt installing, until on December 31, 1936, one hundred eighty-three Sturtevants had been sold to Cement Plants. All on trial. Not one rejection. If not a user can you afford to be without them?

Ask us to send you detailed facts.

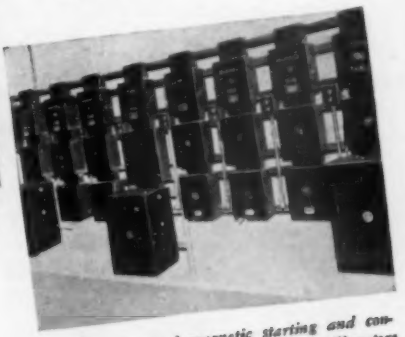
STURTEVANT MILL CO. HARRISON SQUARE **BOSTON, MASS.**

Again G-E LOW COSTS

Cement kiln, 382 feet long, geared to G-E adjustable-speed d-c motor

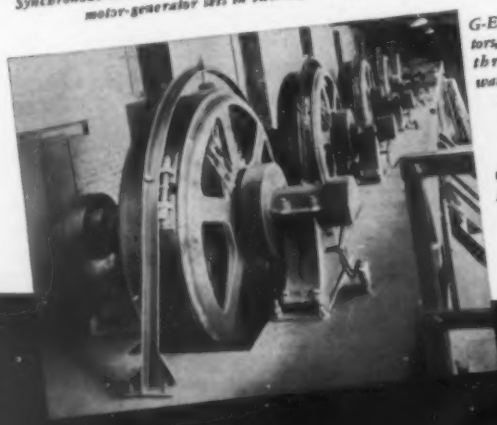
View of Glens Falls Portland Cement Company Plant from top of cement silo

G-E switching equipment, meter transformer, and lightning arresters in main substation

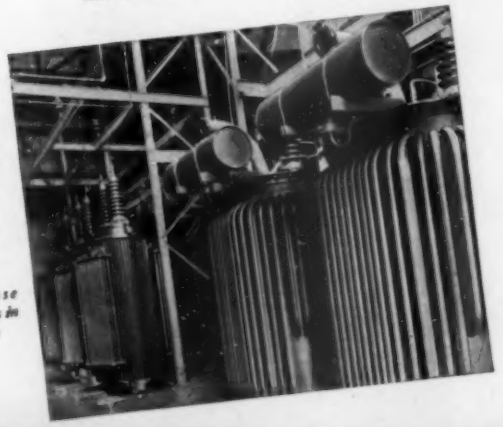


G-E remote-control magnetic starting and control equipments for miscellaneous finish-mill motors

Synchronous-motor starting panel board, switchgear, and motor-generator sets in switchgear room



G-E Synchronous motors, each coupled, through wall, to water-cooled finish-pulverizing mill



G-E single-phase power transformers in main substation

CAMERA SHOTS OF THE TRIP

EQUIPMENT GIVES IN CEMENT PRODUCTION

That's What the Glens Falls Trip Shows

G-E EQUIPMENT, engineers of the Glens Falls Portland Cement Company told us the day we visited their plant, plays an important part in their low-cost production of high-grade cement.

For more than 35 years this company has been using G-E equipment exclusively, they pointed out. At the present time almost every step in the cement-manufacturing process is carried on electrically.

Many Applications for Motors—G-E motors drive the power shovels in the quarry, the crushers, pulverizers, compressors, and the 382-foot kiln. Whether it be a synchronous, induction, or d-c motor, or a gear-motor, each is highly efficient because it is especially adapted to its particular job.

Other Types of Equipment Used—Transformers, switchgear, lightning arresters, motor-generator sets, cable, and control are other types of G-E equipment installed, either in the main substation or at other points in the plant. Because each, like the various motors, meets fully the requirements of its particular application, power costs are kept low, operating efficiency is kept high.

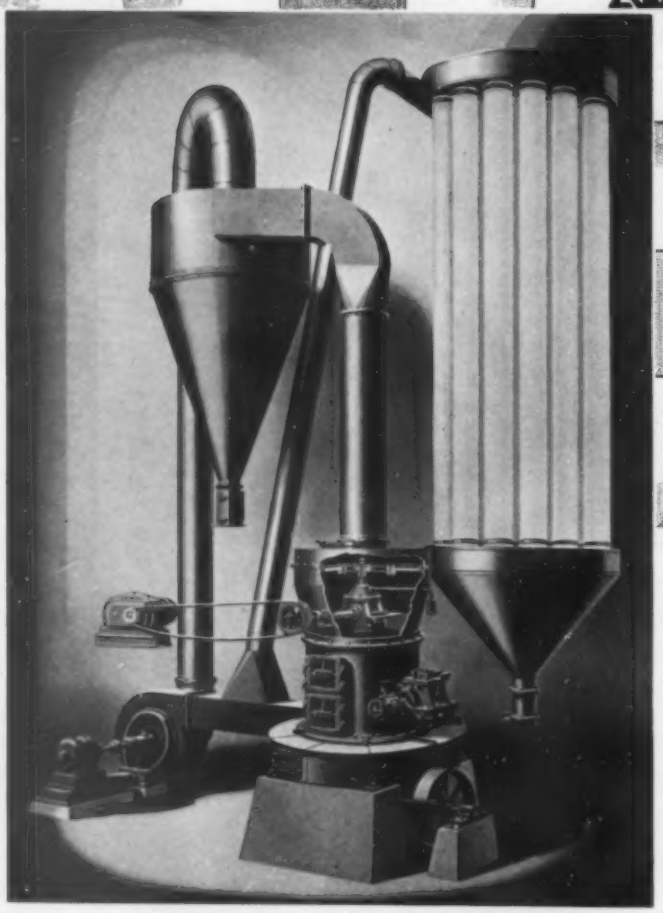
Meeting Competition—A company like this, with its modern, mechanized methods of cement production, is able to meet present-day competition effectively. Why not, by installing G-E equipment, make sure that *your* production is on a similarly favorable basis? Call the nearest G-E representative for suggestions. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

011-163

RAYMOND WHIZZER - EQUIPPED MILLS

Over 100 Sold in Two Years



Raymond Whizzer Type Roller Mill
Write for Bulletin No. 28

Seldom has a machine met such quick and wide acceptance. The reason is performance—in terms of capacity increase and cost reduction that challenge the record of any similar mill. One installation sells another, because the Whizzer Type Roller Mill actually shows production economies sufficient to liquidate the investment in a few months' operation.

•

High Capacity—In fine grinding operations, the Roller Mill with Whizzer Separator shows an increased capacity of 25% to 50% in pulverizing the harder materials, and up to 100% on softer materials.

•

Low Costs—In a typical installation for grinding limestone, the power costs figured on a 24-hour basis for a monthly period were reduced 50% by using a Whizzer Separator on the Mill instead of an ordinary separator.

•

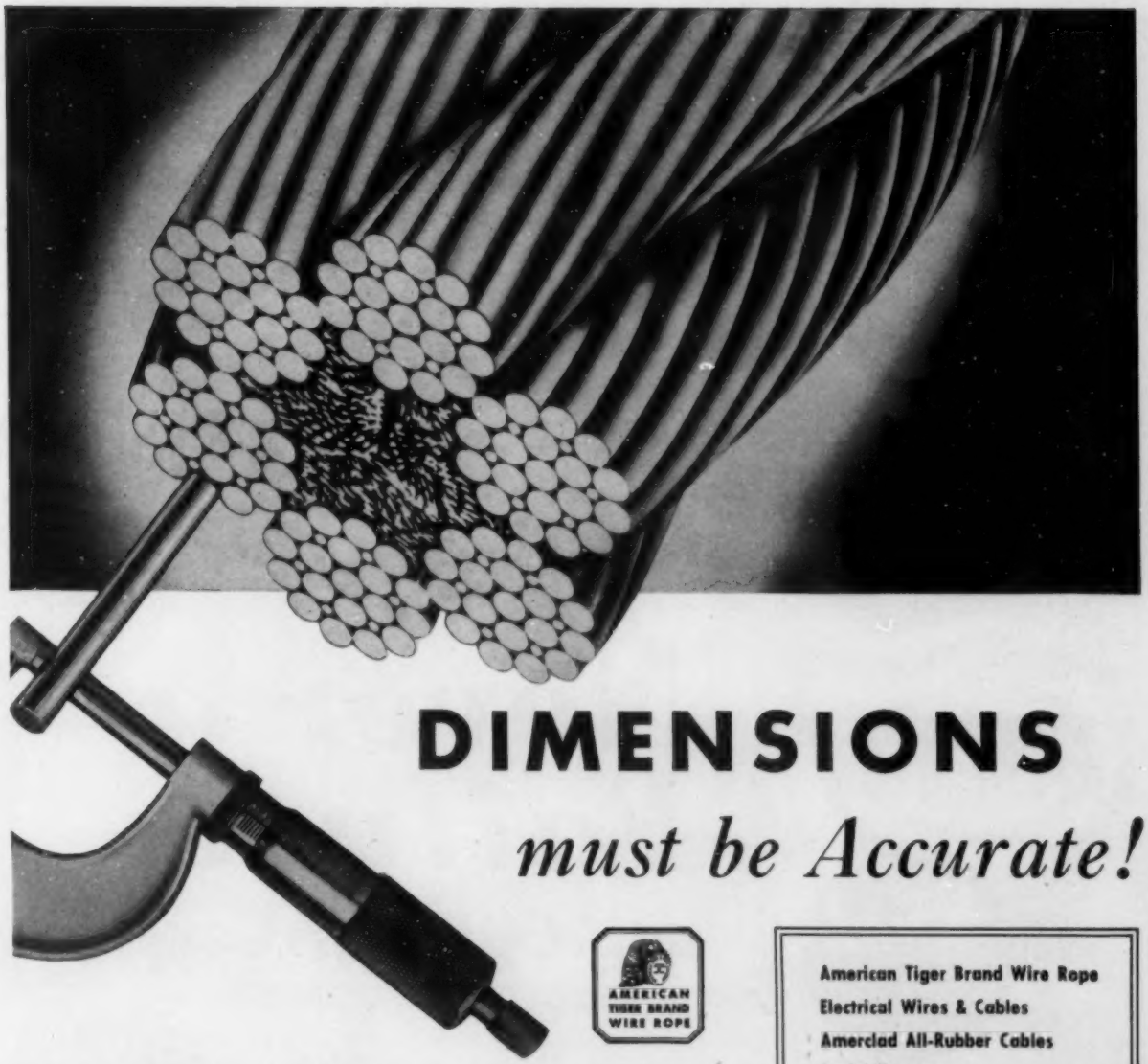
Flexible Control—A variable speed control on the Whizzer drive provides for an infinite range of fineness from 80% minus 100-mesh to 99.75% minus 325-mesh simply by shifting a lever while the mill is running.

RAYMOND

Sales Offices in Principal Cities

PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, Inc.
1307 North Branch Street, Chicago

CANADIAN REPRESENTATIVE: COMBUSTION ENGINEERING CORPORATION, LTD., MONTREAL



DIMENSIONS
must be Accurate!

AMERICAN TIGER BRAND WIRE ROPE

American Tiger Brand Wire Rope
Electrical Wires & Cables
Amerclad All-Rubber Cables
Aerial Tramways
Tiger Wire Rope Slings
Tiger Wire Rope Clips

LIKE any complicated machine*, American Tiger Brand Wire Rope is precision-built. Dimensions must be accurate to insure the smooth working together of the many wires so they will handle your jobs efficiently.

Think how much you demand of wire rope—it must string or reeve easily and quickly . . . spool well . . . avoid whipping at high speeds . . . stand up under the terrific jerks of starting and stopping.

That is the kind of service you can expect from American Tiger Brand Wire Rope. It is the product of engineers who have specialized for years in its design and it is backed by more than 100 years of wire making experience.

American Tiger Brand Wire Rope is available in either Standard (non-preformed) or Excellay (preformed) constructions.

*American Tiger Brand Wire Rope is a machine, more complicated than many, fitting the definition "Any combination of mechanism for utilizing or applying power."

AMERICAN STEEL & WIRE COMPANY
208 South La Salle Street, Chicago · Empire State Building, New York
COLUMBIA STEEL COMPANY
Russ Building, San Francisco
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

A Cordeau detonated blast at the Oklahoma Portland Cement Co., Ada, Okla.

"Never a Failure" with CORDEAU

THIS statement was made by the manager of the Oklahoma Portland Cement Company, where Cordeau has been used for many years.

Naturally it means a lot to us, who make Cordeau. But it can mean more to you who could use Cordeau.

Cordeau-Bickford is an insensitive detonating fuse that insures a powerful and positive detonating wave, functioning at a speed greater than 3 miles per second —to all parts of the hook-up. It was designed and perfected to increase blasting efficiency—and to reduce operating costs.

Consider its distinct advantages:

1. Split second rotation in planned hook-ups result in relief of burden—better fragmentation.
2. Each cartridge, directly detonated by Cordeau, goes with the force of a primer cartridge: more work from your explosives.
3. Less hazard in loading, as Cordeau is insensitive.
4. Larger blasts possible—equipment moved less often.

Lower operating costs are the result. Write for the Cordeau book. It's free.

CORDEAU-BICKFORD DETONATING FUSE

THE ENSIGN-BICKFORD COMPANY, SIMSBURY, CONN.

CB58

MAKERS OF ENSIGN-BICKFORD SAFETY FUSE SINCE 1836

Rex GIVES YOU A Year 'Round Market

FOR YOUR SAND, GRAVEL, STONE AND CEMENT

GET STEADY TURNOVER WITH REX MOTO-MIXERS

Cement and aggregate dealers, all over the country, are turning to Rex Modern Mixers and Agitators with the Modern Cone End Drum as the profitable way to merchandise their concrete materials.

Less than a year ago, the Builders and Industrial Supplies, Inc., of Toledo, Ohio, purchased three Rex Moto-Mixers. A little later, owing to the rapid growth of their ready-mixed concrete business, they purchased two more. Now all five of these machines are kept busy in supplying the demand for ready-mixed concrete in and around Toledo.

Rex Moto-Mixers, with their new, lightweight construction, are giving them more and bigger pay loads per day. They are giving lower ton-mile cost—larger daily profit.

Investigate the Rex Way to higher profits in the aggregate and cement industry.

READY-MIXED CONCRETE

Send today for a copy of the book, "Rex Moto-Mixers and Agitators." It describes the modern way to secure the profitable method of selling cement and aggregates. It illustrates the modern features of the Rex Moto-Mixers.

CHAIN BELT COMPANY
1649 W. Bruce St. Milwaukee, Wis.

REX The Up-to-date Method of Handling Concrete

Moto-Mixers

CHAIN BELT COMPANY *of Milwaukee*

KOEHRING

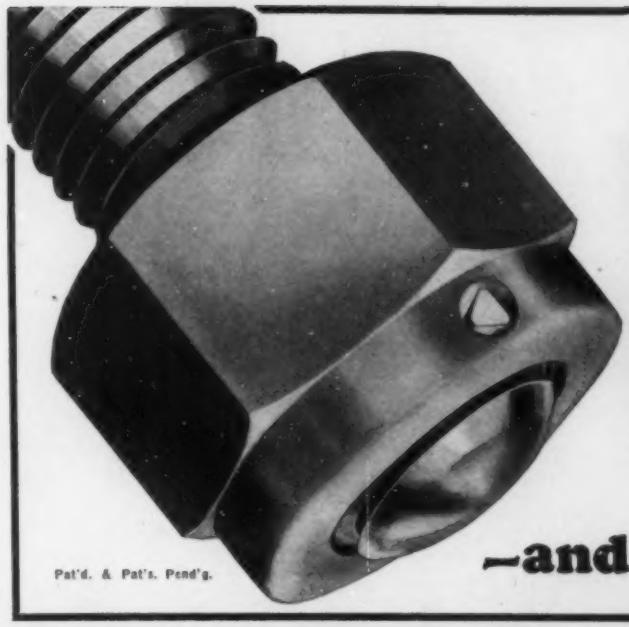
STABILITY

Generous crawler contact with low center of gravity assures positive "stick to the ground" ability for the 251 Dragline Excavator. Stripping in quarries and pits, as well as all other dragline work, requires that sturdy "feet on the ground" feature, so outstanding in Koehring Draglines. No need to cautiously feel your way when operating a Koehring.

KOEHRING COMPANY

Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN



Pat'd. & Pat's. Pend'g.

NEW

—and entirely different

THE NUT THAT CAN'T SHAKE LOOSE

UNSHAKO

SELF-LOCKING NUT

It's Self Contained

It will pay you to find out all about "Unshako", the nut that can't work loose even when subjected to severe and continuous vibration—yet it backs off readily with the aid of an ordinary wrench. It's self-contained —no separate pins or washers to be forgotten or lost. A built-in, self-locking ring or floating thread that works on the brake band principle, does the trick.

"Unshako" is the real solution wherever shock and vibration shake ordinary nuts loose. Can be re-used as often as desired.

Use the coupon and get the complete facts.

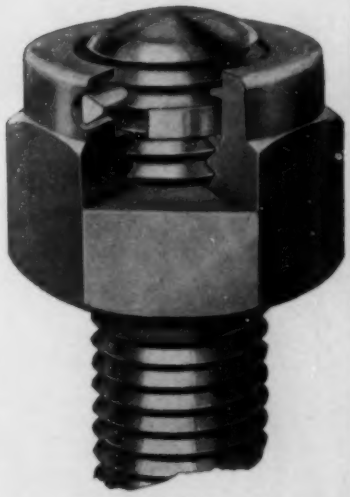


FIG. 1510 "UNSHAKO" SELF LOCKING NUT

Cut out section shows the Locking Ring in position.

STANDARD PRESSED STEEL CO.

BRANCHES: BOSTON, DETROIT, INDIANAPOLIS

JENKINTOWN, PENNA.

Box 563

BRANCHES: CHICAGO, ST. LOUIS, SAN FRANCISCO

also makers of the famous "Unbrako" Screw Line

STANDARD PRESSED STEEL COMPANY
Box 563, Jenkintown, Pa.

Gentlemen:

We would like to hear more about "Unshako" Self Locking Nuts, and why you think it would pay us to carry them.

Mr. _____ Title _____

Firm _____ Address _____

"Williamsport Purple Strand Form-Set"

Is an OUTSTANDING EXAMPLE OF Superior WIRE ROPE MANUFACTURE

Only the finest materials and the surest methods are used to make this popular rope. We draw our own wire, through uniform Carboloy dies, and match each wire *exactly* before it goes into rope. And the entire rope is produced in our factories, by skilled Williamsport workmen. This means economy for you, superior quality and longer service. Get this additional value in your rope purchases . . . save with security . . . rely on Williamsport!

WILLIAMSPORT WIRE ROPE CO.

WILLIAMSPORT, PA. 122 So. Michigan Ave., CHICAGO, ILL.

Other Offices in All Principal Cities

INSTALLATION COSTS ARE LOWER

with

TYPE "S" DIESELS

The modern Type S Diesel is shipped fully assembled and is easily placed on its foundation.

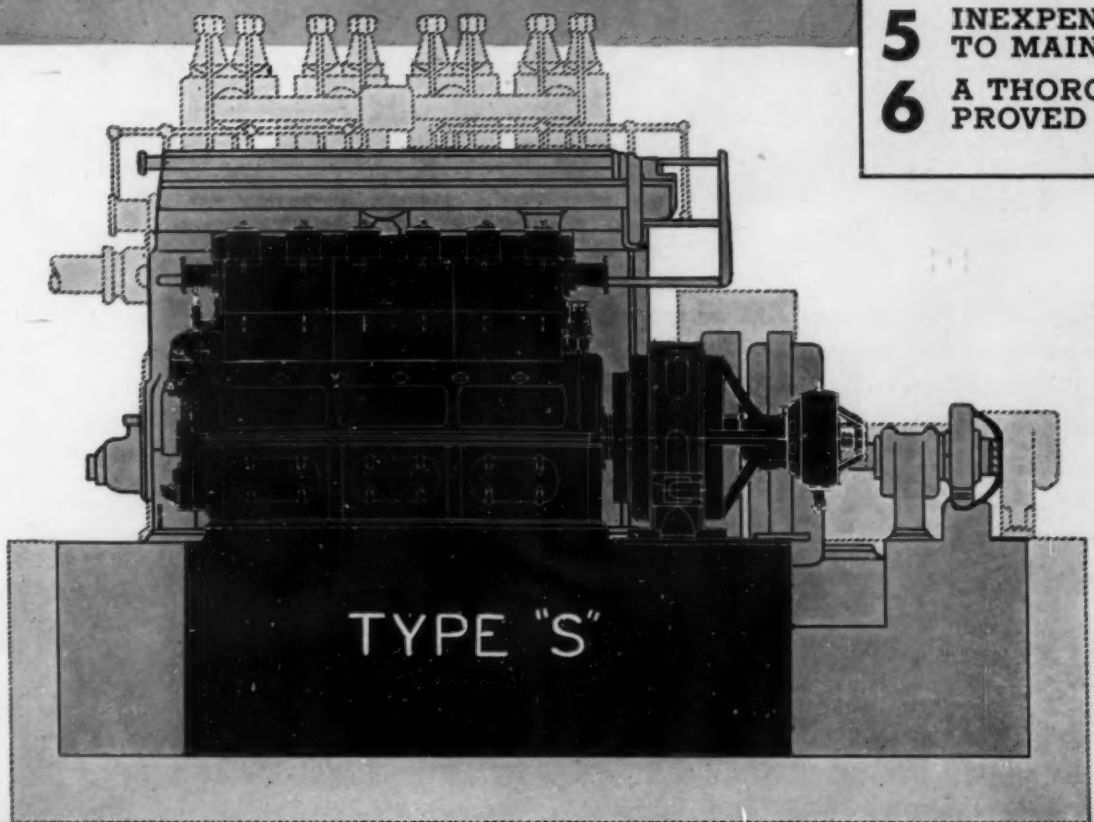
It requires about 30% less floor space, 50% less concrete and weighs 50% less than heavy, slow-speed engines.

Consequently, installation and transportation costs are materially reduced. Often a Type S engine can be installed in an existing building, whereas a heavier engine would require a building extension.

Type S Diesels are rated from 150 to 460 hp. Let us tell you more about them.

A few of the many advantages of Type S Diesels:

1. MODERN DESIGN
2. LOWER FUEL CONSUMPTION
3. LOWER INSTALLATION COSTS
4. MORE EFFICIENT POWER TRANSMISSION
5. INEXPENSIVE TO MAINTAIN
6. A THOROUGHLY PROVED ENGINE



Comparison of space and foundation requirements for a 350 hp. Type S engine and two types of heavy, slow-speed engines.

Atlanta
Birmingham
Boston
Buffalo
Butte
Chicago
Cleveland
Dallas
Denver
Detroit
Duluth
El Paso
Hartford
Houston
Knoxville

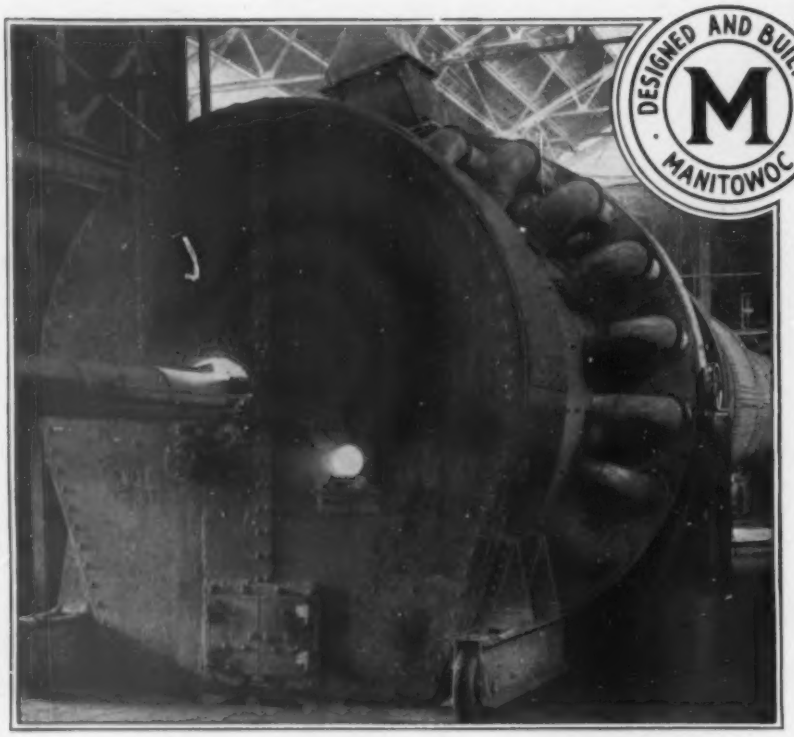
Ingersoll-Rand

11 BROADWAY, NEW YORK CITY

477-7

Los Angeles
Newark
New York
Philadelphia
Picher
Pittsburgh
Pottsville
Salt Lake City
San Francisco
Scranton
Seattle
St. Louis
Tulsa
Washington

The VANDERWERP RECUPERATOR



10-Ft. Cement Kiln Installation of Type CI Short-Plate Recuperator

for

Rotary Kilns

Insures:

Improved Quality of Cement

Better Grindability of Clinker

Maximum Fuel Economy

Highest Efficiency of Heat Recovery

Low Maintenance Cost

"The quality of a cement is in no way dependent upon the absolute quantities of the various constituents, but is regulated by the relationships beween them."

Kühl (Dr. Hans), *Cement Chemistry in Theory and Practice.*

The Vanderwerp Recuperator alone—through rapid air quenching without annealing or slow cooling—establishes these relationships in the most effective manner.

Write—without obligation—for full particulars.

MANITOWOC ENGINEERING WORKS

Division of
Manitowoc Ship Building Company

GENERAL OFFICES AND PLANT
Manitowoc, Wisconsin

CHICAGO OFFICE
131 E. River St.

TRY THIS NEW LINCOLN!

TRY the new *"Shield-Arc SAE"* with 3/32-inch electrode on 24-gauge sheet or, turn up the heat and use it with 3/8-inch electrode on heavy plate. Just try it on any kind of work . . . with any size electrode . . . and you will find this new Lincoln gives the widest range of welding arcs ever afforded by any one welder.

You will also find it *easier* to get *better welds* at *higher welding speed* throughout this *"Shield-Arc's"* extra wide range because its Dual Continuous Control permits the choice of *any type* of arc as well as *any size,* to suit each job individually.

This vastly improved welder performance is being realized in everyday practice by scores of users of the new *"Shield-Arc SAE."* May we arrange a demonstration for you? The coupon is for your convenience. THE LINCOLN ELECTRIC CO., Dept. AM-337, Cleveland, Ohio. *Largest Manufacturers of Arc Welding Equipment in the World.*

Any TYPE or SIZE of arc . . . as simple to get as a station on your radio. Here is the engine-driven "Shield-Arc SAE," *for use out in the field.*

"SHIELD-ARC SAE"

—the New Lincoln Welder with

DUAL Continuous CONTROL

and Self-Protecting Motor

THE LINCOLN ELECTRIC CO.
Dept. AM-337, Cleveland, Ohio

☐ Arrange for us a demonstration of the new *"Shield-Arc SAE"* Welder.

☐ Send Bulletin 412 describing this new welder.

Name..... Position.....

Company .....

Address .....

City..... State.....

Another NEW Northwest MODEL 25

The Fastest 3/4 Yard Shovel Ever Offered!

SPEED—Speed for high output has been the keynote in designing this new Northwest Model 25—3/4 yd. shovel.

Fast dipper action, fast swing, simple, easy, responsive control through the well known Northwest "feather-touch" control, power and stability above the ordinary shovel of this capacity, mobility, short tail swing—all combine to increase output beyond the usual expectation for this class and size of machine.

Ball and roller bearings on all high speed shafts assure the full delivery of maximum engine power, and through the Northwest Cushion Clutch, stresses on all parts under power are reduced when the hoist rope is tensioned, permitting the delivery of its great power yet giving it the cushion of steam.

The Northwest welded boom and welded dipper sticks (no Northwest welded boom has ever failed), combined with the Northwest Independent Crowd which utilizes power other shovels waste, assures the most powerful front end on any 3/4 yd. machine.

Bases are cast steel, far superior to the usual fabricated and welded design. Crawlers are of Northwest self-cleaning, time tested design—built especially for shovel, crane, and dragline service.

Cone type swinging clutches give smooth and fast action—and, being fully convertible from shovel to crane or dragline, the Model 25 gives you a machine for every job.

GASOLINE • DIESEL • ELECTRIC
Priced Right. Be sure to investigate before you buy!

NORTHWEST ENGINEERING COMPANY

The world's largest exclusive builders of gasoline, oil, diesel or electric powered shovels, cranes, draglines, pullshovels and skimmers

1820 Steger Bldg.,
28 E. JACKSON BLVD.
Chicago, Illinois

NORTHWEST

Maximum Effective Performance *at Peak Load!*

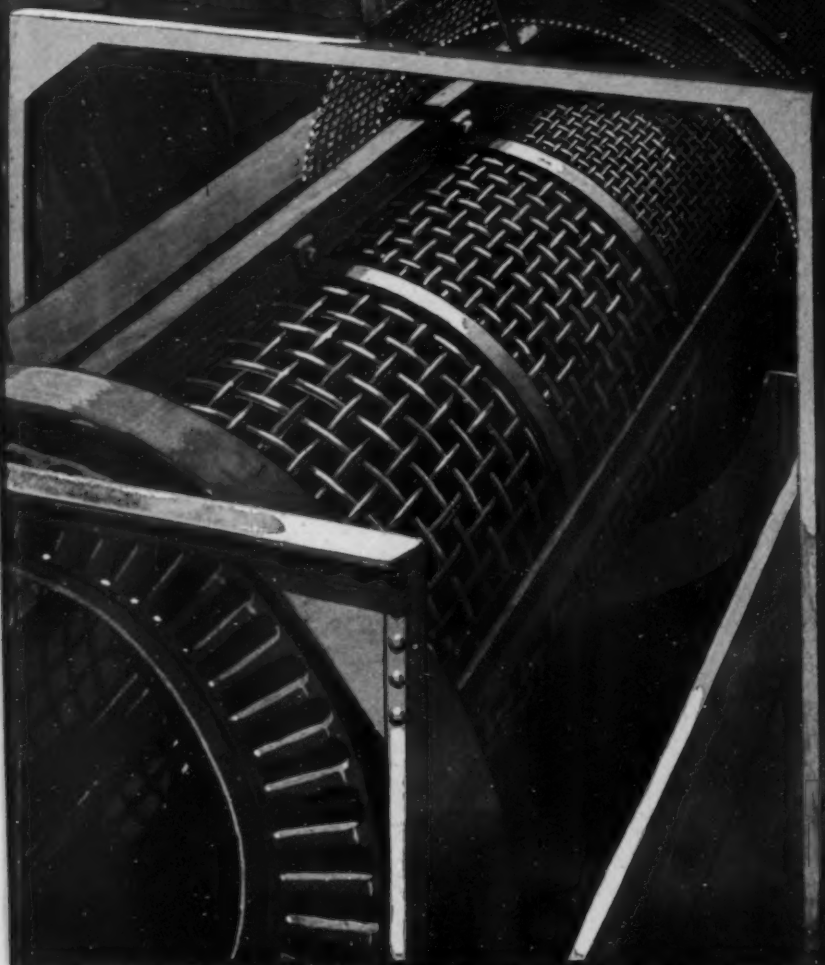
It's the peak load that proves the worth of Woven Screens.

It is then, with the crushing system crowded to the limit, that the extra capacity of Woven Screens pays big dividends.

Heavy square-mesh grizzlies or slot screens, ahead of the preliminary crusher, relieve the crushing system of a great amount of useless, wasteful work. With Woven Screens for scalping, the bins get ALL material of satisfactory sizes—the secondary crushers work only on the oversizes. Power wastes from useless conveying and recrushing are eliminated. Excessive fines and dust from useless cleavages are avoided. Both crushing costs and subsequent process steps reflect the efficient performance of the Woven Screens.

Positive Screen Control of both initial feed and circulating load is the basic principle of really economical crushing.

See the New Sta-Tru Long-Mesh Screen. Full description and samples on request.



LUDLOW-SAYLOR WIRE CO.
600-616 S. Newstead Ave.
St. Louis, Mo.

Please send us Book No. 48-W "Getting Results."

.....

.....

.....

.....

The LUDLOW-SAYLOR WIRE COMPANY ST. LOUIS

600-616 S. NEWSTEAD AVE.

LUDLOW-SAYLOR WIRE CO.
600-616 S. Newstead Ave.
St. Louis, Mo.

Please send us Book No. 48-W "Getting Results."

.....

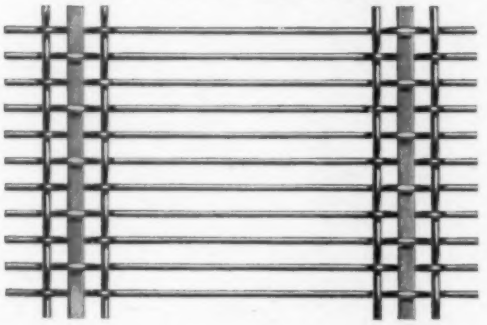
.....

.....

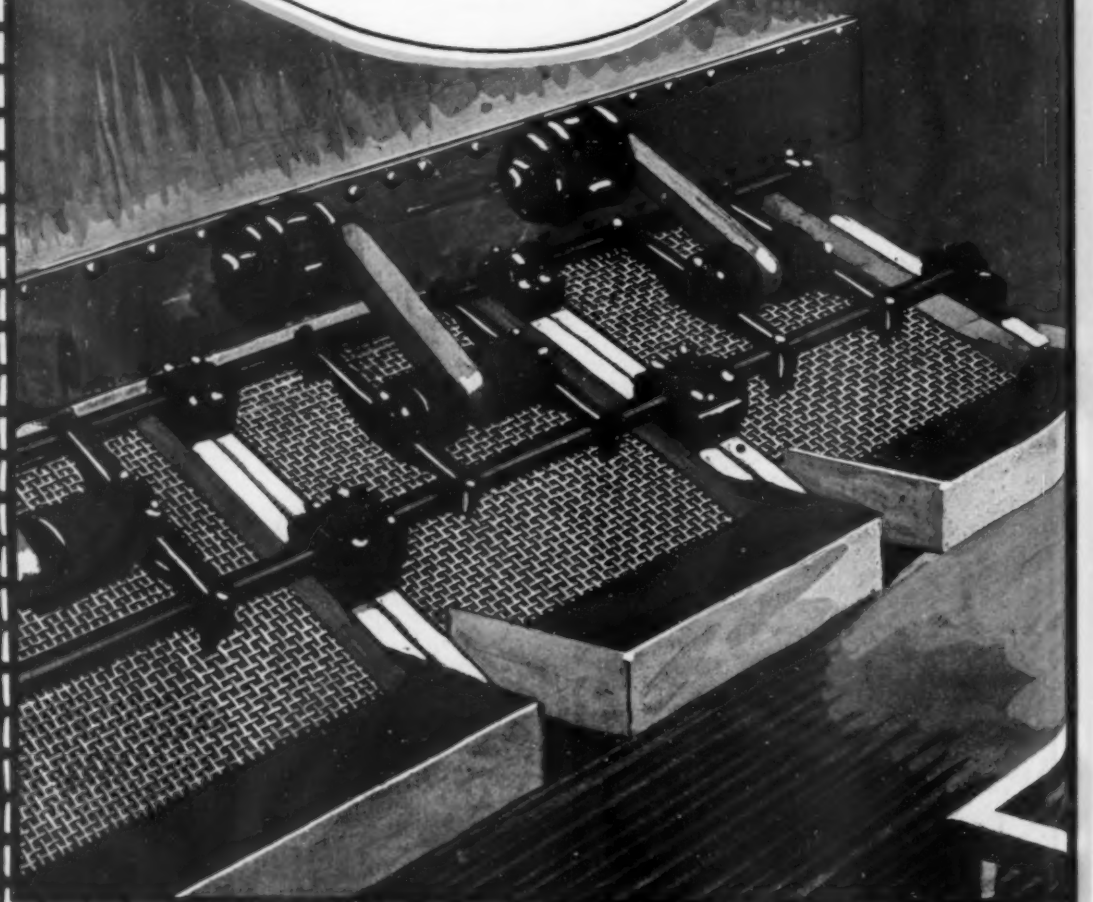
.....

SQUARE MESH and LONG-SLOT

WOVEN WIRE SCREENS FOR ALL PURPOSES



See the New Sta-Tru Long-Mesh Screen. Full description and samples on request.



The LUDLOW-SAYLOR WIRE COMPANY ST. LOUIS

600-616 S. NEWSTEAD AVE.

Select the Rope that Fits Your Job

The Langlay wire rope core layed in the opposite direction to the lay of the outer strands, exerts a counteraction to the tendency of the outer strands to spin and unlay. A non-spinning rope of this construction is ideally suited for high, vertical lifts of unguided loads. The non-spinning rope is poorly adapted to resist crushing, it must therefore be used with good drum winding conditions. The socket terminal connection applied with molten metal has been found to be the only satisfactory method of fastening a non-spinning rope. The use of wire rope clips causes the rope to be pinched out of shape with resultant sacrifice of rope life. Tell us what rope you are using and we will suggest ways of getting the longest possible life out of it.

WICKWIRE SPENCER STEEL COMPANY, *General Offices:* 41 East 42nd Street, New York. *Sales Offices and Warehouses:* Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles; *Export Sales Dept.:* New York.

WICKWIRE SPENCER SALES CORPORATION, New York, Chattanooga, Tulsa, Portland, Seattle.

WIRE ROPE
by Wickwire Spencer

WICKWIRE SPENCER STEEL CO.
41 East 42nd St., New York City
Please send me your new Rope Manual that tells how to make wire rope last longer.

Name _____

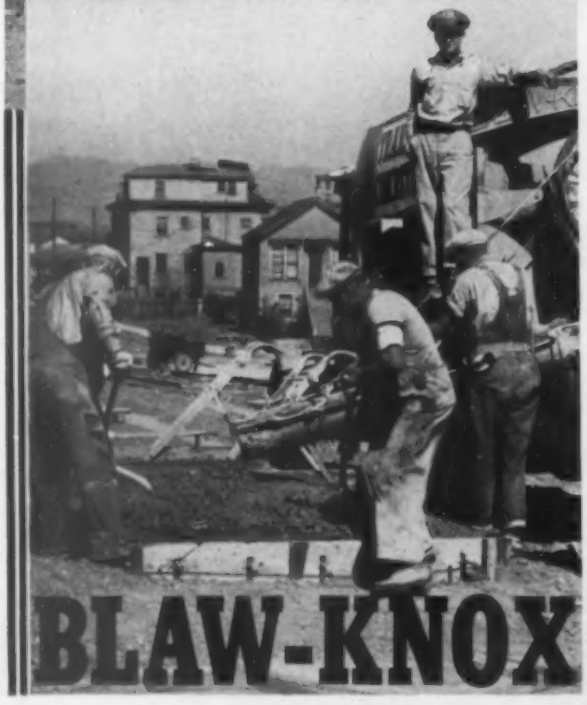
Firm _____

Address _____

City _____ State _____

STIFF? DRY? SURE—
YOU CAN EASILY CONTROL THE QUALITY OF CONCRETE WITH A BLAW-KNOX TRUKMIXER

Pouring pavement slab on underpass construction in California.



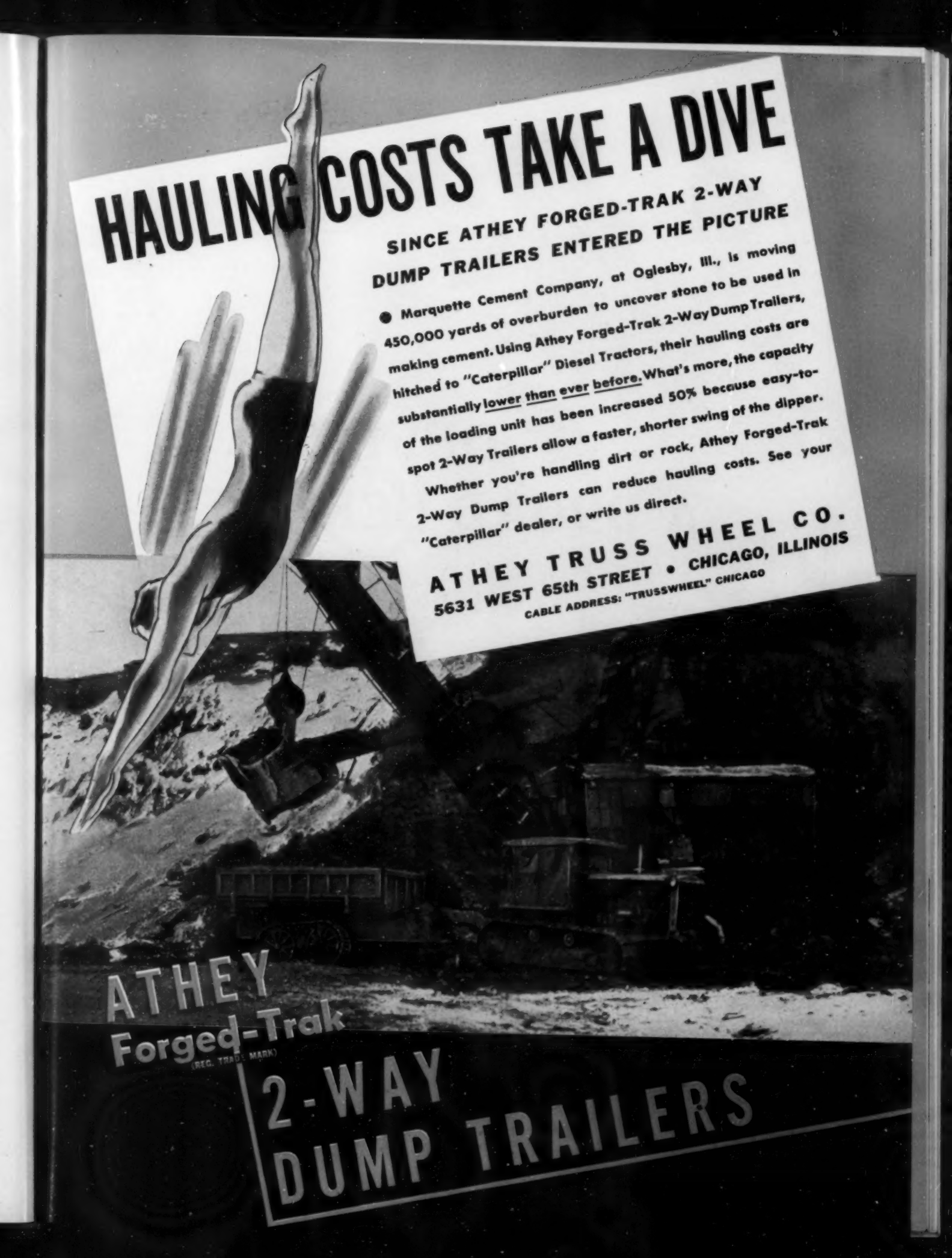
Judge the value of a Truck Mixer by its ability to consistently produce and deliver concrete of high, uniform quality for any mix that may be specified or desired.

Investigate the mixing blade arrangement and the more rapid and thorough mixing action; the accuracy of water control; the fast, clean discharge—and then compare the fine points of engineering and construction which make the Blaw-Knox TRUKMIXER the most dependable unit for uninterrupted service.

To produce quality concrete at low cost, use Blaw-Knox TRUKMIXERS and Agitators.

BLAW-KNOX COMPANY
2035 FARMERS BANK BLDG., PITTSBURGH, PA.
Offices and Representatives in Principal Cities

BLAW-KNOX TRUKMIXERS


HAULING COSTS TAKE A DIVE
SINCE ATHEY FORGED-TRAK 2-WAY DUMP TRAILERS ENTERED THE PICTURE
● Marquette Cement Company, at Oglesby, Ill., is moving 450,000 yards of overburden to uncover stone to be used in making cement. Using Athey Forged-Trak 2-Way Dump Trailers, hitched to "Caterpillar" Diesel Tractors, their hauling costs are substantially lower than ever before. What's more, the capacity of the loading unit has been increased 50% because easy-to-spot 2-Way Trailers allow a faster, shorter swing of the dipper.
Whether you're handling dirt or rock, Athey Forged-Trak 2-Way Dump Trailers can reduce hauling costs. See your "Caterpillar" dealer, or write us direct.
ATHEY TRUSS WHEEL CO.
5631 WEST 65th STREET • CHICAGO, ILLINOIS
CABLE ADDRESS: "TRUSSWHEEL" CHICAGO
ATHEY
Forged-Trak
(REG. TRADE MARK)
2-WAY
DUMP TRAILERS

Jeffrey

OFFERS A BROAD SERVICE

If your costs are loaded by inefficient handling . . Jeffrey is the source from which you can get the right stone products processing and handling equipment to bring those costs down to rock bottom.

Processing and handling equipment bearing the name "JEFFREY" will enable you to meet strictest specifications and assure you genuine dependability, at a cost that is easy on your pocketbook.

Jeffrey equipment and plant engineering covers the entire stone products industry . . sand and gravel, crushed rock and cement. In this broad line are units and products for standard and special service . . apron, belt and screw conveyors; bucket elevators, feeders and screens; sand dewaterers, portable conveyors and loaders; products, such as chains, sprockets and conveyor idlers for replacement purposes. A unit or a complete plant.

Call on Jeffrey for economical handling and reduction.

THE JEFFREY MANUFACTURING COMPANY

935-99 North Fourth Street COLUMBUS, OHIO

1877 60 Years 1937

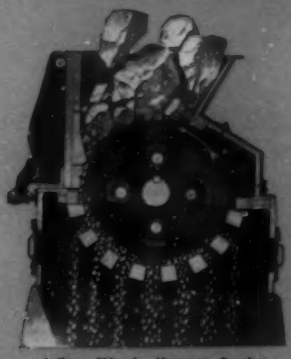
BELT CONVEYORS
SAND HANDLING AND SCREENING EQUIPMENT
CHAINS
DEWATERERS
SAND SETTLING TANKS
SPIRAL CONVEYORS
BUCKET ELEVATORS
ELECTRIC VIBRATING SCREENS AND FEEDERS
CRUSHERS, PULVERIZERS AND GRINDERS
PORTABLE LOADERS AND CONVEYORS
APRON FEEDERS
TRANSMISSION MACHINERY

A battery of Jeffrey sand dewaterers, eight units arranged in two groups of four. Each group is so provided with clutches that adjacent pairs may be disconnected and one run independent of the other.

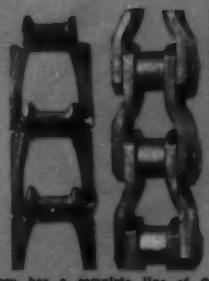
A complete line of standardized Bucket Elevators. A vertical spaced centrifugal discharge Elevator is shown below.

Jeffrey Spiral Conveyors — handle lime, gypsum, cement and other loose material economically. Can be made dustproof.

Jeffrey-Traylor electric vibrating Feeders (Patented) handling aggregate to Jeffrey Belt Conveyor in a large aggregate plant.



Jeffrey Miracle Hammer Crusher (Patented) for reducing large sizes of limestone.



Jeffrey has a complete line of Chains for elevating, conveying and drives. Also Sprockets and Attachments.

Jeffrey Inclined continuous Bucket Elevator with single or double strand of chain. Also inclined spaced elevators.

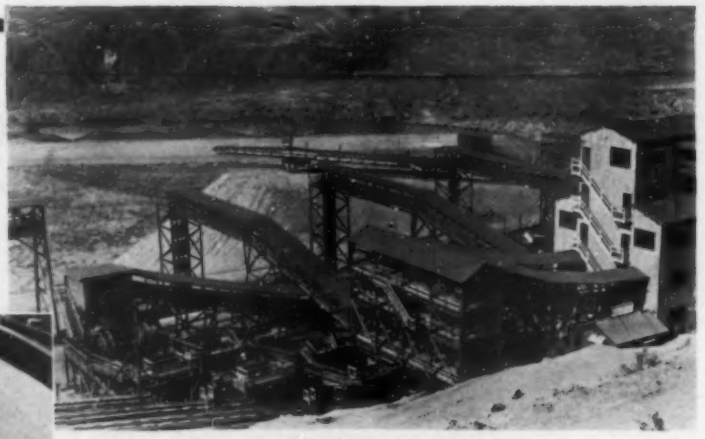
Increasing production with closed-circuit Jeffrey-Traylor Screens (Patented) in a modern cement plant. Power unit is overhead, out of the way.

When ordinary sand won't do— *try* DORR-CLASSIFIED SAND

Boulder Dam, in Nevada—T.V.A., in Tennessee—Grand Coulee Dam, in Washington.

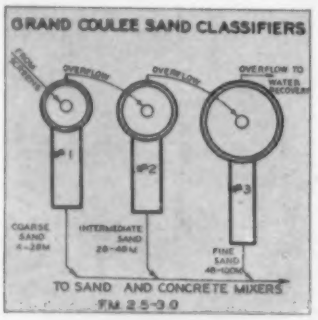
Three big federal construction jobs with rigidly-specified concrete sand.

Three large Dorr Classification plants—each delivering super-quality sand, meeting or exceeding specifications.



Grand Coulee Dam Aggregates Plant

Close up of No. 3 Dorr Bowl Classifier



The Dorr System for preparing high specification concrete sand is an adaptation of Dorr methods in world-wide use for the preparation of metal ores—gold, silver, copper, lead, etc. This system brings to the sand and gravel industry the accurate control of particle size that is indispensable in mining and metallurgy.

In substance, the Dorr System is just this—

- Three Dorr Bowl Classifiers receive the raw sand-water mixture in sequence—one after the other.
- Each Classifier removes from the stream a certain fractional amount, lying between two predetermined meshes.
- The three graded fractions are blended in the correct proportions to yield a sand having the specified distribution of sizes and fineness modulus.
- The waste wash water, laden with silt and fines, is clarified and reused.

Write now for a technical report on the Dorr System at Grand Coulee Dam and get prepared to meet the inevitable tightening of sand specifications.

DORRCO

THE DORR COMPANY INC.

ENGINEERS • 570 Lexington Ave., New York

CHICAGO • TORONTO • DENVER • LOS ANGELES • ATLANTA

DORR TECHNICAL SERVICES AND EQUIPMENT ARE AVAILABLE FROM THE FOLLOWING COMPANIES:

HOLLAND: Dorr-Oliver N. V. The Hague
FRANCE: Soc. Dorr-Oliver, Paris
GERMANY: Dorr Gesellschaft, m. b. H. Berlin
ENGLAND: Dorr-Oliver Company Ltd., London
AUSTRALIA: Crossle & Duffy Pty. Ltd., Melbourne
SOUTH AFRICA: Edward L. Bateman Pty. Ltd., Johannesburg
JAPAN: Andrews & George Co. Inc., Tokio
ARGENTINA: Luis Fiore, Buenos Aires
BRAZIL: Oscar Taves & Co., Rio de Janeiro

BUILT TO GIVE *More Swings per Hour..*

Note upward curve of boom and high location of the shipper shaft, permitting unusual dumping heights without sacrifice of operating stability.

..MOVE MORE YARDS PER DAY

As compact and nimble as a sub-chaser—as rugged and powerful as a dreadnaught—the half-yard Badger was designed with a single object in view . . . *faster output.*

There is no swinging counter-weight to slow down the starting and stopping operations. No cab to limit visibility of operator. Low center of gravity holds the Badger steady. Boom dipper and dipper stick of light alloy steel, internal expanding clutch drums with extra wearing surface, and 41 anti-friction bearings combine to hold down operating and maintenance cost. *The net result is a faster starting, faster swinging, faster stopping, faster digging unit* that cuts digging time and costs amazingly.

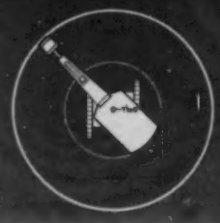
Get the full story of the Badger's outperforming characteristics . . . Its unusual stability . . . Its extra dumping height and reach . . . Its speedy portability to new jobs at truck speeds . . . Its convertibility for crane, drag line, trench hoe, or pile driver. Mail coupon.

THE AUSTIN-WESTERN ROAD MACHINERY CO.
AURORA, ILLINOIS

Saves Time IN TIGHT PLACES

When opening a cut or traversing a narrow road, the Badger may be run close against the bank. Only an 8-foot roadbed is required. An additional 6 feet for loading of trucks makes the total width 16 feet.

With a full revolving half-yard shovel 7 to 8 feet of clearance ON ALL SIDES is essential to allow for all swing . . . a total of 14 to 16 feet. Trucks spotted beside the shovel require an additional 6 feet.



Austin-Western

The Austin-Western Road Machinery Co., V, Aurora, Illinois

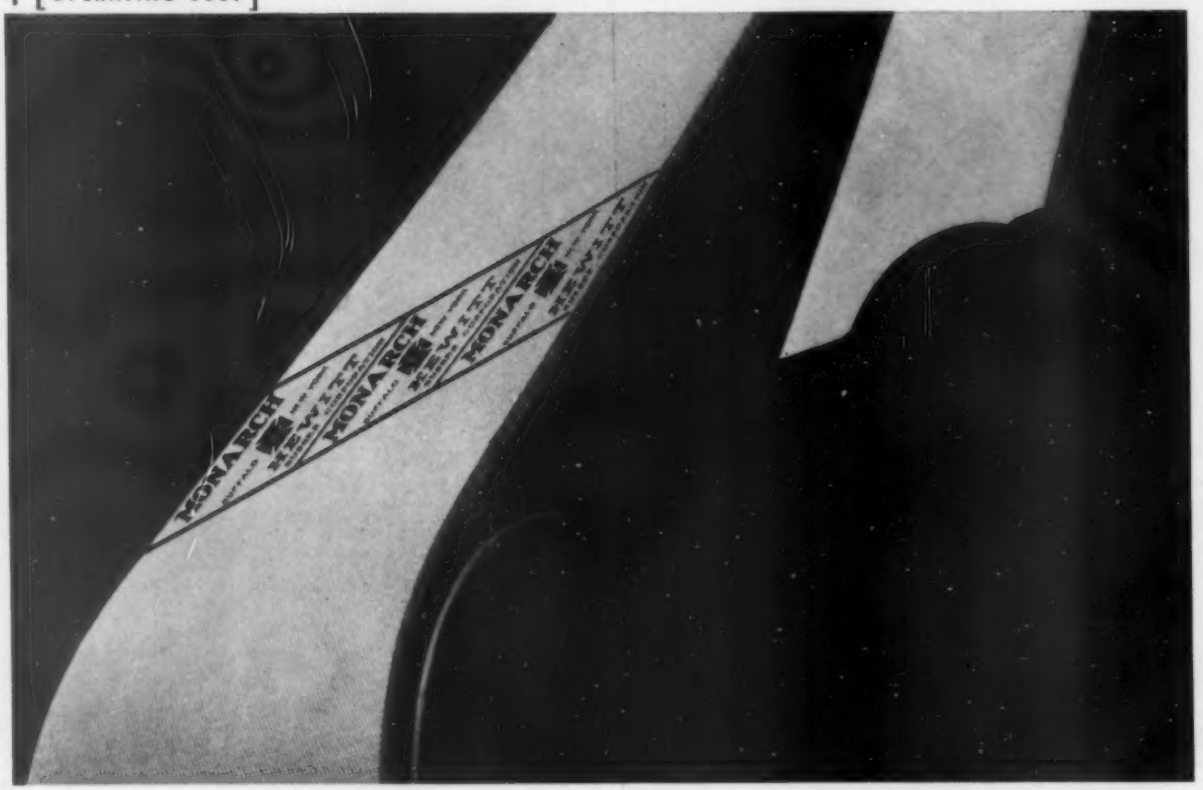
☐ Send a salesman
Tell me more about the

☐ Badger Shovel	☐ 8-Yd. Scraper
☐ Motor Grader	☐ 12-Yd. Scraper
☐ Roll-A-Plane	☐ Trail Cars
☐ Blade Grader	☐ Shovels and Cranes
☐ Motor Sweeper	☐ Bituminous Distributors
☐ Crushing & Washing Plants	☐ Snow Plows
☐ Elevating Graders	S14-705

Name .....
Address .....
City ..... *State* .....

O.C.+ GOES ON DIET

+ [OPERATING COST]



Here's a suggestion to any plant official concerned with lowering his operating costs. Investigate HEWITT transmission belt. For countless companies have found that a change to HEWITT has meant an actual "reducing diet" to their operating costs. Behind the production of HEWITT industrial rubber goods is the paramount purpose to prove HEWITT leadership by cutting industry's O. C. That's why stern attention is paid to building extra strength and stamina . . . longer life . . . into every product bearing the name of HEWITT. Doubtless there are places in your plant where a cut in costs can be accomplished by a switch to HEWITT hose and belting. There's a nearby distributor who will welcome the chance to talk it over with you and explain the HEWITT Proof Test Plan. You will find him listed in the classified telephone directories of major industrial centers under "Rubber Goods" or "Belting".

HEWITT
RUBBER CORPORATION
BUFFALO, NEW YORK

HOSE • CONVEYOR AND TRANSMISSION BELTS • PACKING

MAR 13 1937

©CIB 332264

Rock Products

Volume 40 Chicago, March, 1937 No. 3

ORDERS Follow The Flood

A CHECK-UP on flood conditions throughout the Ohio River and Upper Mississippi valleys, revealed that the rock products industry, while handicapped by lack of power and water, is staging a remarkably rapid recovery.

River sand and gravel operators in the upper Ohio River Valley resumed operations within a few weeks, but several with operations downstream will be occupied for weeks in reconstruction of their plants. Money paid out for labor for the reconditioning of plants will doubtless represent the largest part of the flood cost.

Equipment loss was proportionately not large, while damage to electrical equipment was general and extensive throughout the flooded section. The other chief item of loss was damage, or contamination, to stockpiles of finished materials, or their total loss through washing into the river. Sand stocks were lost in some cases, while most of the gravel stocks can be retrieved by rewashing. Emergency equipment was rapidly installed in some cases for such rewashing. Apparently, there was not much loss or damage to floating equipment.

Turning to the other side of the picture, we find true the familiar phrase, "behind every cloud is a silver lining," for the extensive damage done highways, railways, pavements, sewers and other municipal structures, and the still more extensive damage to buildings of all kinds mean heavy demands on producers of cement, lime, gypsum, crushed stone, sand and gravel which go into the more substantial, if not "permanent" types of construction.

Much of the cost of flood damage to plants in these industries will be paid for several times over by the demands made upon them by their neighbors who also suffered. Moreover, as is the case in every disaster, much study and experimenting will be done to build as nearly "flood-proof" structures as possible.

There is a further hazard in our great river valleys and drainage areas, of which for obvious reasons little is said, but of which scientists are well aware. That is the earthquake hazard. Floods transfer millions of tons of soil from one part of the earth's crust to another and distant one. Hence the loading of the earth's crust becomes unbalanced and to relieve the stress eventually a slip takes place. That's an earthquake, and scientists tell us no part of the world is exempt from that hazard. So eventually we must learn to build flood-proof, fire-proof and earthquake-proof, insofar as scientifically possible. That will be concrete's day.

T. J. Hall Co., Cincinnati, lost its storehouse in the flood, but some of the contents can be seen in the foreground

River Plants Recovering From FLOOD DISASTER

Greatest Losses to Stockpiles and Electrical Equipment

By Bror Nordberg

WEEKS will be required to determine total damages suffered by rock products plants located on the lower reaches of the Ohio river, during the recent superflood, but those on the upper river and its tributaries have already recovered and with few exceptions are now in operation. Losses will total many thousands of dollars, when the wreckage is removed and plants are reconditioned.

Damages to plants logically were most serious in the regions of highest water. River stages in the upper Ohio valley did not equal those of 1936, but increased steadily downstream until the gauge reading equalled the 1936 mark at Point Pleasant, W. Va. From this point downstream, all records were shattered and destruction mounted to peaks at Louisville and Paducah, Ky.

Pittsburgh plants were unaffected. Operators between Pittsburgh and Point Pleasant, W. Va., moved all damageable equipment and office records to points high enough to protect them from a river stage of the 1936 proportions, when the latest high water mark was established. The only flood loss to these plants, with exceptions, of course, was the labor of moving equipment and in cleaning up, an occasional motor to be dried out, the rewashing of gravel and business losses during a few weeks' shutdown.

The Lower River

Such precautions were inadequate below Point Pleasant, where the river levels broke all previous records, and "safe" high spots could not prevent equipment from being submerged. In some instances, such machinery was moved several times before owners and superintendents had to admit that their task was a hopeless one. Water rose as high as 6 in. an hour at some points. Many operators in these areas were unable to remove equipment before it was too late.

Most severe losses were suffered by those plants on the river between Cincinnati, Ohio, and Cairo, Ill. Here, an occasional office building disappeared, storehouses were torn to bits, heavy machinery was bowled over like so much tinder, bins collapsed, conveyors were twisted, office furniture was ruined and many companies suffered the loss of all office records. In many cases, all motors were submerged and stockpiles of sand were washed away. Muddied waters permeated deeply into gravel stockpiles, necessitating the rewashing of thousands of tons.

When all plants are finally reconditioned, the greatest loss probably will be charged to the labor required in removing and replacing equipment and in the clean-up of equipment, and removal of debris. Without exception, all plants will pay out considerable in wages. As far as we know there was no loss of floating equipment, some of which was securely fastened to trees with full crews of men on duty at all hours and some of which was removed to secluded creeks and bayous.

Quick Recovery

Destruction was most severe where the river's course was such as to strike plants with the full force of the current. Backwater, in other cases, did no more than submerge plants and then subside, leaving a simple clean-up job in its wake. More permanent foundations and structures will likely take the place of those which collapsed.

About 30 ft. of embankment was swept away by the Muskingum river at Conesville, Ohio, and the plant of the Zanesville Gravel Co. almost went with it. Note the temporary cribbing where water had undermined the plant foundations

LEFT: New 400-ton steel gravel bin of Nugent Sand Co. gave way to the Ohio river at Louisville. RIGHT: Conveyors were broken and the sand stockpile was flattened out at E. T. Slider Co.'s plant at Louisville. Someone's house came to rest at the right

The restoration of sand and gravel plants to operating condition was accomplished quickly. Shipments were made shortly after the waters subsided, but actual dredging and plant operation was delayed until power and light could be restored. Where the delay was too great, emergency equipment was pressed into service by some companies. Dredging concerns had no washing facilities at their land plants, so emergency pumps were installed to re-wash gravel before shipment.

Stricken communities in many instances were indebted to those companies which by use of their floating equipment aided in rescue work and in transporting needed supplies. Cement plants were used for relief purposes and to house the homeless.

Rehabilitation

Out of the flood will come a substantial increase in demands for aggregates and cement, for many months, to rebuild residences and commercial buildings, for the repair of highways and streets and for the ballasting of railroad tracks. Much of this business will accrue to those plants directly affected by the flood, many of which have already received enough flood business to more than pay for damages sustained. Others will eventually get enough of this business to offset their damages, and a few will be the losers in the end. Plants will be kept busy filling orders delayed during high water plus the unestimated flood business, and others at more distant points will share in the re-building of stricken cities.

Some of the observations, grouped according to states, are as follows:

West Virginia

STANDARD SAND AND GRAVEL CO., Wheeling, removed some motors and covered others in anticipation of high water. Damage consisted of labor costs for clean-up and the loss of several weeks' business.

OHIO RIVER SAND AND GRAVEL CO., Wheeling plant, saved its motors by removing them on skids to high ground. Main damage consisted of the loss of three weeks' business and necessary clean-up. Stock on hand was low. In 10 days, shortly after the flood crest passed, this plant shipped 73 cars of ballast for repair of local railroad tracks.

OHIO VALLEY SAND CO., INC., New Martinsville, removed motors and had no loss except several weeks' business and a general clean-up.

OHIO RIVER SAND AND GRAVEL CO., New Martinsville plant, had losses totalling many thousands of dollars. The river bank at the plant site was caved badly and all conduit wiring had to be dismantled to remove mud. About 10,000 tons of specification sand were carried down the river, at a loss of approximately $7500. It was estimated that 30,000 tons of gravel would be re-washed at a cost of $10,000. About three weeks' business was lost, much of which was expected to be recovered later. The fleet of tugs and barges was tied up in the river and a full crew kept on deck for emergencies. This plant shipped 144 cars of ballast within 5 days for use on railroad tracks along the Ohio river.

A storehouse collapsed at the New Martinsville plant of the UNIVERSAL CONCRETE PIPE CO., with the loss of two carloads of cement. Little damage was sustained at Huntington, W. Va., where plant operators lost a few weeks' orders and had a little clean-up work to do.

A 4-in. pump was installed by E. T. Slider Co. at Louisville to re-wash gravel

These operators said that the flood waters in this vicinity were unusually free of mud. Water rose to a height of 10 ft. under the bins at the Union Sand and Gravel Co.

GREEN BAG CEMENT CO. OF WEST VIRGINIA had considerable loss at its plant at Kenova. Here, the water reached within 4 in. of the office ceiling, seriously damaging office records and completely demolishing office equipment. Motors were submerged throughout the plant, where it reached a depth of 12 to 14 ft. Here, water damaged the cement near the bottoms of the silos. Luckily there was no capillarity and the cement further up was unaffected. Shipments were being made a few weeks after the water subsided and plant operation was to be resumed about March 1.

UNION CONCRETE PIPE CO., Ceredo, was completely inundated with serious damages to all electrical equipment. The curing kilns were raised from their foundations and destroyed, seriously damaging steam curing equipment.

Ohio

MARIETTA CONCRETE CORP., Marietta, was practically unaffected, being located on high ground near the Muskingum river. Losses incurred by H. A. SMITH, Marietta, were only $800 to $1000, despite the fact that the plant is located at the junction of the Muskingum and Ohio rivers. Water completely submerged the office. Equipment was undamaged save for a few motors, and low stock on hand luckily kept the re-washing costs to a minimum. Already orders are being filled for aggregates and masons' sand.

Plants along the Muskingum river were quite seriously affected. MUSKINGUM SAND AND GRAVEL CO., Zanesville, damages totalled $15,000, including the repair of five submerged motors and the re-washing of some 50,000 tons of gravel in stockpile, at a cost of $10,000.

Flood waters were more far reaching at Dresden, where seepage filled up the pit and submerged haulage equipment of the ZANESVILLE GRAVEL CO. Here, cave-ins broke and covered the discharge pipe from the pump in the pit.

Cables saved the pump in the foreground when it tumbled into the Muskingum river at the Conesville, Ohio, plant of Zanesville Gravel Co.

Nugent Sand Co., Louisville, had quite a clean-up job to do. Note the conveyor on the left

ABOVE: The Ohio river reached the bins of the Union Sand and Gravel Co., Huntington, W. Va., in the center. The picture was taken during high water. BELOW: Kosmos Portland Cement Co., Louisville, took active part in rescue work. The company's boat, on the left, is pictured on duty at Evansville, Ind.

A layer of hard clay below prevented the drainage of water from the pit, making it necessary to pump all water through the regular 6-in. wash water pump. Operations will be delayed about four weeks until the pit is pumped dry.

The Conesville plant of the Zanesville Gravel Co. had serious damages in 1936, and all but floated away in the Muskingum river this year. Precautions were taken in advance and much equipment was anchored. About 30 ft. of the bank was washed away, undermining foundations and leaving part of the steel framework overhanging the river. Temporary tie cribbing was placed immediately. Piling is to be driven and considerable backfilling done before the plant can resume operations. The wash water pump was catapulted into the river, but was tied to a tree by cable and salvaged. Losses were estimated at $2500. About 1000 tons of sand were lost and 2000 tons of gravel are to be re-washed.

Portsmouth Sand and Gravel Co., Portsmouth, outside of a little clean-up, was undamaged. The company buildings were sand-bagged to keep them from floating away.

Losses totalling $15,000 were incurred by T. J. Hall Co., large sand and gravel operators at Cincinnati. The plant office was swept away and also a 50x75-ft. galvanized iron storehouse on concrete foundations. Reserve equipment in the storehouse was considerably damaged as were magnetos in loading equipment. A sand trestle was undermined. A new office building was erected immediately. Five motors at the plant of the Van Camp Sand and Gravel Co., Cincinnati, were damaged, the total loss being $500, including the re-washing of a small amount of gravel. Ohio Gravel Co., Cincinnati, was reported to have shipped 123 cars of railroad ballast immediately after the flood.

The Ironton plant of the Alpha Portland Cement Co. was surrounded by water but undamaged. Railroad service caused a temporary cessation of shipments from this plant. Refugees were housed in the plant, and employes were active in rescue work during high water.

Kentucky

Destruction to plants was most serious at Louisville. Louisville Sand and Gravel Co., on comparatively high ground, had little damage except the curtailment of operations due to the lack of power and water. Water at the plants of the Ohio River Sand Co., Inc., Nugent Sand Co., and E. T. Slider Co., Louisville, reached within inches of the second floor ceilings in the offices. Losses in office equipment and records were heavy.

E. T. SLIDER Co. losses consisted of wreckage of a sand stockpiling conveyor and the re-washing of 15,000 tons of gravel. A 4-in. Jaeger gasoline-driven pump was installed for re-washing gravel when loading in trucks for shipment. When Louisville's water supply was threatened, the *C. C. Slider*, steamboat of the E. T. SLIDER Co., was moored adjacent to the pumping plant to supply needed steam to drive the pump. Four 1½-in steam pipes were welded to the main header to the pump, and steam at 225 p.s.i. was furnished to drive the pump. For 10 days, 20,000,000 gal. of water daily were pumped.

Outside of a heavy array of debris, NUGENT SAND Co. damages were confined to office damage and the collapse of a new 400-ton steel gravel bin.

All homes owned by the KOSMOS PORTLAND CEMENT Co. at Kosmosdale for employes were evacuated, with considerable damage to the interiors. The plant was inundated and practically all electrical wiring and motors were under water. Emergency equipment was installed to facilitate plant rehabilitation, due to long shutdowns of electrical power. Floating equipment owned by the company was used in rescue work both in removing people and stock. Other than office damages, the plants at Paducah were not seriously damaged. READY MIX CONCRETE Co., Covington, had slight damage to cement and complete destruction of office equipment. Two weeks' business was lost.

Indiana

KOCH SAND AND GRAVEL Co. and BEDFORD-NUGENT Co., Evansville, suffered damages to offices and office equipment. As late as February 20, no word had been heard regarding the condition of the latter concern's plant at Shawneetown, Ill.

Prepared for Flood

GREEN BROS. GRAVEL Co., INC., Lexington, Miss., recently removed much equipment from Clarksdale and Holly Bluff in anticipation of high water in the delta areas, to the plant at Jones Crossing, Miss. Heavy pontoons were anchored down and labeled in case they should break away from their moorings. Heavy engines and tractors were placed on top of high gravel piles and mounds.

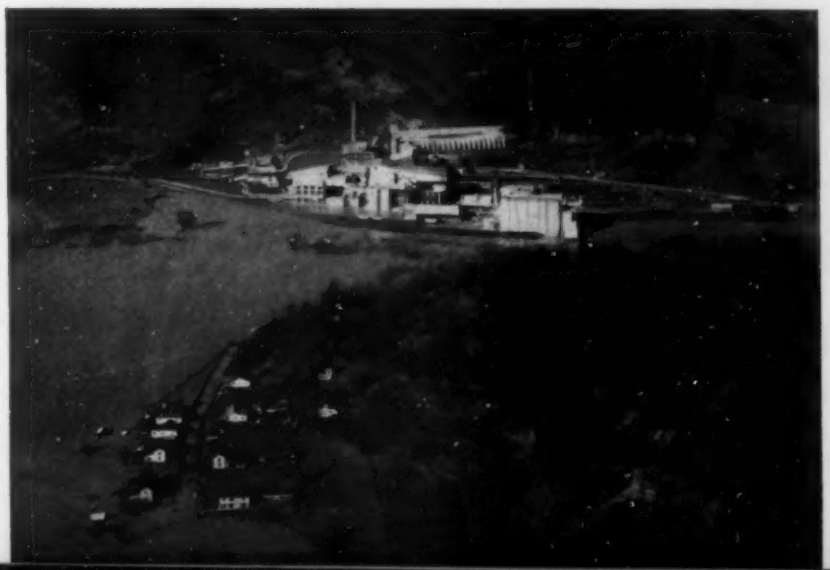
Gravel Boat in Flood Relief

TENNESSEE SAND AND GRAVEL Co., Sheffield, Ala., had its steamboat "Jayhawker" on duty at Paducah, Ky., during the recent flood, for carrying supplies and performing other missions of mercy. The steamer was put into service in coöperation with the corps of engineers, Nashville, Tenn.

Another view of the debris in the yard of the Nugent Sand Co., Louisville

All that remained of a 10,000-ton sand stockpile at the New Martinsville, W. Va., plant of the Ohio River Sand and Gravel Co. The stockpile was up to the conveyor before the Ohio river came up

ABOVE: Zanesville Gravel Co., Dresden, Ohio, will spend four weeks pumping seepage from its pit. BELOW: Airplane view of the Alpha Portland Cement Co. plant at Ironton, Ohio, at the flood crest



National Conference on Silicosis Hears Committee Reports

Papers on Medical and Engineering Control: Legal Economic, Insurance, Administrative Phases

THE NATIONAL SILICOSIS CONFERENCE convened in Washington on February 3, at the call of Secretary of Labor Frances Perkins, for what was probably its final meeting, to receive the completed reports of the committees through which the work of the conference was handled.

Invited by Secretary Perkins to participate were those representatives of industries, organizations and individuals whom she called together a year ago to study means for dealing with the silicosis problem and others more recently interested in this subject. The sessions were presided over by Verne A. Zimmer, director of the Bureau of Labor Standards of the Labor Department, under whose immediate supervision all of the work of the Conference has been carried out.

Mr. Zimmer's brief opening address traced the chaotic state of public information about silicosis—its nature, how acquired, disabling effects, precautionary means, compensation, legal and legislative angles—and referred to the expressed desire of the Secretary of Labor to clarify the situation, to end new cases of disability and develop suggestions for compensating legislation fair to employers and employes involved in silicosis disability cases.

The work of the conference has been highly commendatory and the reports, when available, will constitute the most practical contributions to popular aspects of the subject which have been made. These reports, exclusive of their voluminous references and other appended material occupy some 1500 pages of manuscript but have been condensed for more general use into excellent summaries totaling about 90 pages.

Committee Reports

The four committees occupied the following fields:

(1) Medical and Medical Control, Dr. R. R. Sayers, chief surgeon, U. S. Public Health Service, was chairman of this group, which included recognized leaders in the field of medical research, lung and dust diseases, industrial and public health.

(2) Engineering Control, headed by Warren A. Cook, of the Connecticut State Department of Health, who was assisted by a committee of recognized experts on the engineering phases, with several active sub-committees dealing specifically with:

Plant design and renovation.

Application of good housekeeping and maintenance to dust control.

Methods of ventilation and dust collection.

Wet methods.

Personal respiratory protective devices—their uses and limitations.

Determination of concentration and character of industrial dusts.

Management's and employe's responsibility in engineering control.

Engineering bench marks of dust concentration.

(3) Economic, Legal and Insurance Phases, of which V. P. Ahearn, executive secretary of the National Sand and Gravel Association, was chairman. The membership of this committee included a carefully selected group of persons expert in the legal angles, industrialists and representatives of labor conversant with the economic phases and compensation insurance experts.

(4) Regulatory and Administrative Phases. L. Metcalf Walling, Secretary of Labor of Rhode Island, was chairman of this group, which was comprised largely of public administrative officers attached to departments of health or labor.

Since the primary objectives of the Conference were to understand silicosis and end silicosis disability, the report of the Medical Committee was, perhaps, of greatest basic importance, although all of the reports contribute richly to the store of practical information on the subject, so badly needed by industry and medical, insurance and administrative specialists who have to do with occupational disease disability.

Silicosis Overrated

A most enlightening statement explaining the relatively small importance of silicosis as an occupational disease appears in the summary of committee reports. It fixes the probable number of workers who suffer any work disablement at this time from the disease at about 4000 to 5000, a fraction of 1%. (Based on a total of 49 million workers in the United States and 4400 estimated disabling cases, this proportion would be around 9/1000 of 1%.) Only 1% of the total employed were stated to be exposed to the disease. Therefore, the problem presented by silicosis is far less serious than that of some other occupational diseases. It has been overrated.

The medical committee pointed to free silica as the single positively known cause of silicosis and admitted frankly that it is not now possible to lay down absolute standards limiting the safe exposure of human lungs to free silica. Under a variety of conditions the committee believes these limits to vary considerably. But it did feel that it could well suggest an arbitrary formula for the limitation of respirable free silica (under 10 microns) which would offer practical protection to health under most conditions, and at the same time fall within the limits of good engineering practice.

Dangerous Concentrations

Prolonged exposure to concentrations above 5 million particles per cu. ft. of highly silicious dust was pronounced dangerous, while it was not considered necessary to name any concentration limit for dusts which carry under 5% of free silica. Attention was called to the fact that the hazard is dependent on the proportion of a workman's time actually spent in the dust concentration.

The arbitrary formula suggested by the committee for limiting exposure is built around an allowable total of 5 million particles of free silica per cu. ft. of breathing air, which might be obtained from a 5 million particle concentration of 100% free silica, a 10 million concentration of 50% free silica, or a 50 million concentration of 10% free silica, for example.

The medical report discusses quite thoroughly the relationship of silicosis to disability, one of the most important considerations from the viewpoint of any industry which finds itself confronted with damage suits. Recently suits have been filed where little, if any, disability could be discovered or was claimed. But juries have favored the plaintiff on the sole grounds that silicosis *per se*, is disabling. The report specifies that a diagnosis of silicosis does not necessarily imply disability.

Tuberculosis and Silicosis

A forward step is taken by the medical committee when it declares that individuals with active tuberculosis are considered unsuitable for further employment in even a nominal silica exposure, regardless of whether or not silicosis can be demonstrated. This position is in keeping with the statement made by the committee to the effect

that practically all individuals disabled due to silicosis show signs of pulmonary infection as a complication.

Preventive Measures

The engineering committee's report contains a wealth of information of value to those who are to take practical measures for dust control. In the consideration of plant structures which may house dust hazards, such subjects as ventilation, storage of dusty materials; material handling equipment, isolation of dusty processes, exhaust systems, dust arresters and underground operations are discussed in detail.

Good housekeeping is stressed as an efficient and undoubtedly the least expensive single method of dust control. Good housekeeping procedures, including maintenance of equipment and floors and the elimination of bad practices, are given a great deal of merited space. General methods of ventilation include dust collection systems, exhaust hoods, piping, primary dust separators, secondary separators and arresters, high tension and dynamic precipitators. Wet methods of dust control, personal respiratory protective devices and numerous other considerations of the problem from the engineering angle are given excellent consideration.

Economic, legal and regulatory angles of the report are of such character that they should be of great help in the drafting of new occupational disease legislation, almost all of which is really silicosis legislation brought about by the recent silicosis hysteria. In view of the very enlightening and helpful nature of the entire report it should and probably will have broad distribution as soon as arrangements can be made. Additional appropriations may be necessary to cover the expense.

The report should be of value in quieting needless fears of workers in dusty occupations, in eliminating actual hazards where found to exist, in discouraging unwarranted damage suits, in keeping down insurance rates, in directing new legislation along helpful and sensible lines, in finding fair and reasonable compensation rates and methods, and in preventing unfortunate social consequences of silicosis such as unnecessarily separating desirable silicotic workers from their jobs.

The National Silicosis Conference was successful and it is to be hoped that the volume of excellent material developed by it can soon be made generally available.

Some Flood Business

FRANCE STONE CO., Bloomville, Ohio quarry, is reported to be operating at full capacity on flood orders for crushed stone.

Carries Own Compensation Insurance

NEW HAVEN TRAP ROCK CO., New Haven, Conn., has carried its own workmen's compensation insurance since 1934. A. L. Worthen, vice-president, in Information Circular 6920, U. S. Bureau of Mines, "Quarrying and Crushing Methods and Costs at the Plainville, Conn., Quarry," gives the following information about insurance:

"Before 1934 insurance carriers covered the workmen of this plant for compensation. Because of the fine no-accident record of the various plants and the general increase in compensation rates on account of silicosis, the company adopted in 1934 self-insurance for all payments of compensation under the Workmen's Compensation Act of Connecticut. A certificate of "Solvency and financial ability to pay compensation directly to injured employees or other beneficiaries" was obtained from the compensation commissioner of each district in which plants of the company are operated. A reserve of 5% of each pay roll is set aside to take care of compensation payments, and a policy is carried insuring against all payments from $10,000 to $100,000 resulting from one accident.

"All employees have been given a physical and X-ray examination, and no new employee is hired until a physical examination has been made. X-ray pictures are taken when the employee has worked for the company more than 6 months. Additional periodic check-ups are made when conditions warrant.

"Fire insurance is carried on all buildings of the plant and their contents. Each building and its contents is insured within 80% of actual value with the 'reduced rate contribution clause' applying.

"A manufacturer's public liability policy covering any claim up to $50,000 as the result of an accident on the company property to any one person or $100,000 as the result of any one accident, is in effect. Amounts up to $25,000 are paid by another insurance carrier for any liability claims arising from steam-boiler or air-tank explosions.

"Excess contingent coverage is also carried on any and all hired cars or trucks, also on the cars of all employees who may be sent out on company business, by an automobile liability policy carrying $50,000 and $100,000 personal liability and $5,000 property damage. This policy includes all company-owned vehicles operating on the highways.

"Group accident and sickness policies are available for a nominal monthly charge to all employees of the company who have worked 1 year or more. Employees who have worked for the company 3 years are given a $500 life insurance policy, and no payment on this policy is required of the employee while he remains in the company's employ.

New Officers

PETOSKEY PORTLAND CEMENT CO., Petoskey, Mich., elected John L. A. Galster president at a recent meeting of the board of directors. Mr. Galster had held the office of treasurer and general manager of the company since its organization. Other officers are G. W. John, vice-president and general manager; H. H. Lucas, vice-president and traffic and sales manager; Homer Sly, vice-president; J. C. Buckbee, vice-president; E. O. Nyman, secretary.

Elected Secretary-Treasurer

BESSEMER LIMESTONE AND CEMENT CO., Youngstown, Ohio, announces that John Q. Adams was elected secretary-treasurer at a meeting of the board of directors. Mr. Adams started with the company as a clerk several years ago and has served as auditor, assistant secretary, assistant treasurer and secretary.

January Statistics

PORTLAND CEMENT INDUSTRY in January, produced 6,633,000 bbl., shipped 4,678,000, and had in stock at the end of the month 24,396,000. Production and shipments showed increases of 81.7 and and 19.4% respectively, as compared with January, 1936. Stocks at mills were 7.5% higher than a year ago.

The factory value of the shipments from the mills in 1936—112,566,000 bbl.—is estimated as $170,431,000, representing an average value of $1.51 per bbl.

According to the reports of producers the shipments totals for 1936 include approximately 3,015,000 bbl. of high-early-strength portland cement with an estimated mill value of $5,769,000.

The statistics here given are compiled from reports for January, received by the Bureau of Mines, from all manufacturing plants except two, for which estimates have been included in lieu of actual reports.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of January, 1936, and of 160 plants at the close of January, 1937.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	January		Dec.	Nov.	Oct.
	1936	1937	1936	1936	1936
The month..	16.1	30.4	40.3	50.9	56.0
The 12 mos. ended	29.0	44.9	42.7	41.5	40.0

Cement storage has been increased by over 100,000 bbl. New silos are of concrete stave construction

Bringing Old Cement Plant Up-to-Date

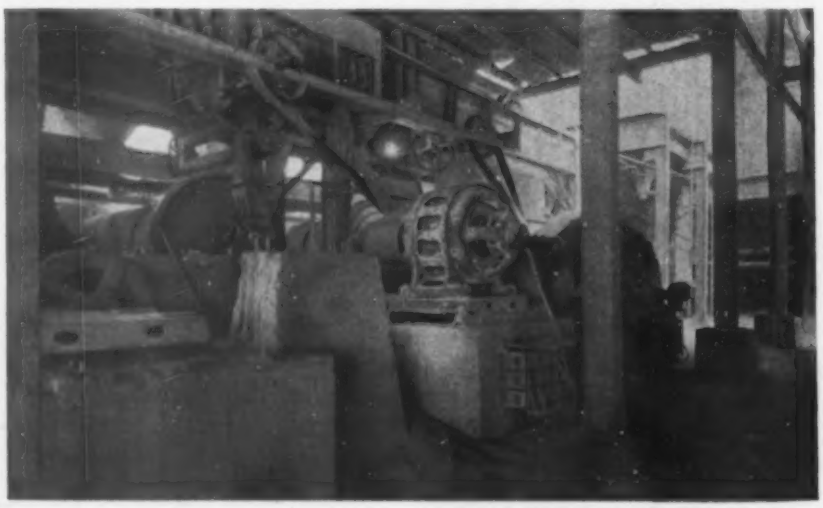
Superior Cement Corp., Portsmouth, Improves Operating Efficiency Without Extensive Rebuilding

SINCE the cement plant of the Wellston Iron Furnace Co., Superior, Ohio, changed hands about five years ago to become the Superior Cement Corp., many improvements in operating methods have taken place, and additional changes are being planned for the near future.

During this stretch of five years, with comparatively low expenditures for equipment, the kiln operating efficiency has been raised from about 50% to 97%; three kilns now produce the clinker equivalent of five kilns in 1931; and the consumption of coal has been reduced from 130 or 140 lb. per bbl. of cement to 117 lb. These figures are not for an ideal low ash content coal, but apply to the high ash coal mined by the cement company.

The plant was built in 1906 and is one of the oldest active plants in the country today. Originally, very little storage was provided either for stone or clay, with the result that important operations were dependent upon uninterrupted preceding ones, without reserve for breakdowns. Continuous production of the finished cement could not go on if there was a failure somewhere back along the line. Eliminating these critical points or "bottle-necks" and providing reserves have done much to increase the total operating hours of the kilns for any given period of time.

The improvements responsible for the better final product and more efficient operation are not due to any one factor but to a combination of new equipment additions and rearrangements of the old—all being accomplished without curtailment of normal production and while the mill was running. They best can be described by tracing the flow of materials through the mill, with some repetition of the old processes that have not been changed.



Raw grinding mills are now driven by motors with V-belts

Stone Mined

Slag at one time was brought in, to be proportioned and used with limestone in the kilns, but now all necessary materials are taken from a single drift mine in the hill above the crushing plant. In the mine, that is now being worked at a location 8900-ft. from the entrance, exist stretches of sandstone rock which are mined and used in definite proportions in the kilns to raise the silica content of the finished cement. The clay below the rock increases steadily in iron content in a downward direction, to the point where it contains up to 50% iron. This for-

tunate occurrence is used to advantage in the manufacture of low-heat cements.

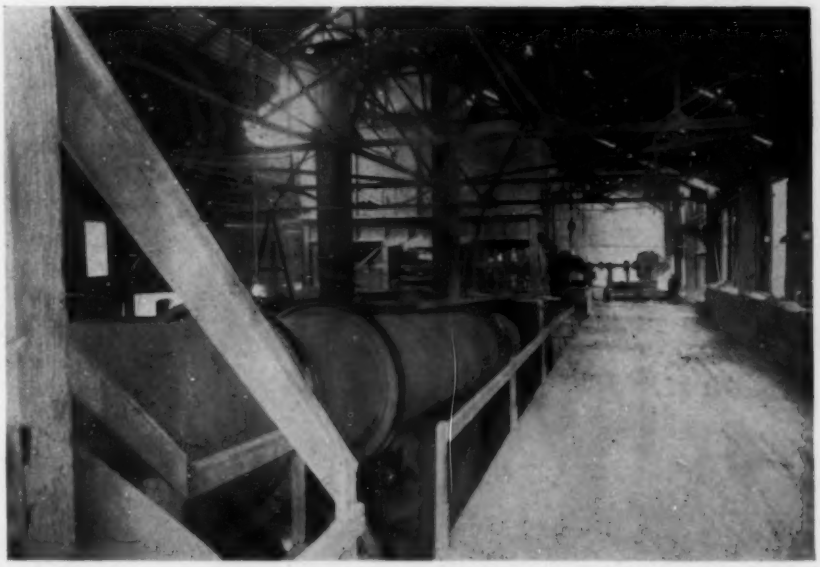
The limestone rock is undercut by Sullivan cutting machines and then "dropped down" 6 in. It is hand-loaded to 4-ton end dump cars, which are hauled to the crushing plant by a Westinghouse electric locomotive. At present, the method of mining and the haulage system is being modernized to do away with hand labor and shorten the haul to the crushers. Myers-Whaley loaders, new cutting machines and a portable air compressor are to be installed as well as an aerial cableway to deliver rock from the mine. When completed, workings will be consolidated in one place and the mine will be more efficiently operated and supervised. All the materials pass through a No. 9 Gates gyratory crusher followed by two No. 5 crushers of the same make.

The crushing plant is on the hillside and the raw storage bins are on the mill level below. Belt conveyors carry the crushed products to four storage bins. The stone storage capacity is 1400 tons, that for sandstone is 120 tons, and clay bins for two kinds of clay have a capacity of 700 tons.

Handling Stone and Clay

Two kinds of clay and the sandstone are proportioned over table feeders and fed to a 5½ by 50-ft. Mosser dryer. Table feeders likewise control the flow of stone to a 6 by 50-ft. Bonnot dryer, installed two years ago. A 50-ft. centers bucket elevator carries the dried stone to a 150-ton bin, and the dried clay and sandstone mix to a 90-ton bin. The contents of these bins are blended over 54-in. Bonnot table feeders and the mix is carried over a belt conveyor on 20-ft. centers to the Hercules mill. Here the mixture is pulverized to 41.4% passing a 200-mesh sieve; 100% passing a 4-mesh screen.

This fine product passes to a screw conveyor feeding a bucket elevator, to a 35-ton bin above the raw tube mills. Originally, the plant was equipped with five 5½ by 20-ft. tube mills. One of these has been removed and is now being used in the manufacture of the high early strength cement "Tri-Cal." Two mills are inactive. The other two, operating in closed circuit with separators, are able to meet the kiln requirements with existing storage capacities.



A 6x50-ft. dryer was installed two years ago

Each mill is driven by a 175-hp. Westinghouse motor through Texrope drive and the two Sturtevant separators are similarly driven by 40-hp. motors. Wherever feasible, Texrope drives have been substituted for other types throughout the mill. The passable separator product is of a fineness of 93.5% through the 200-mesh.

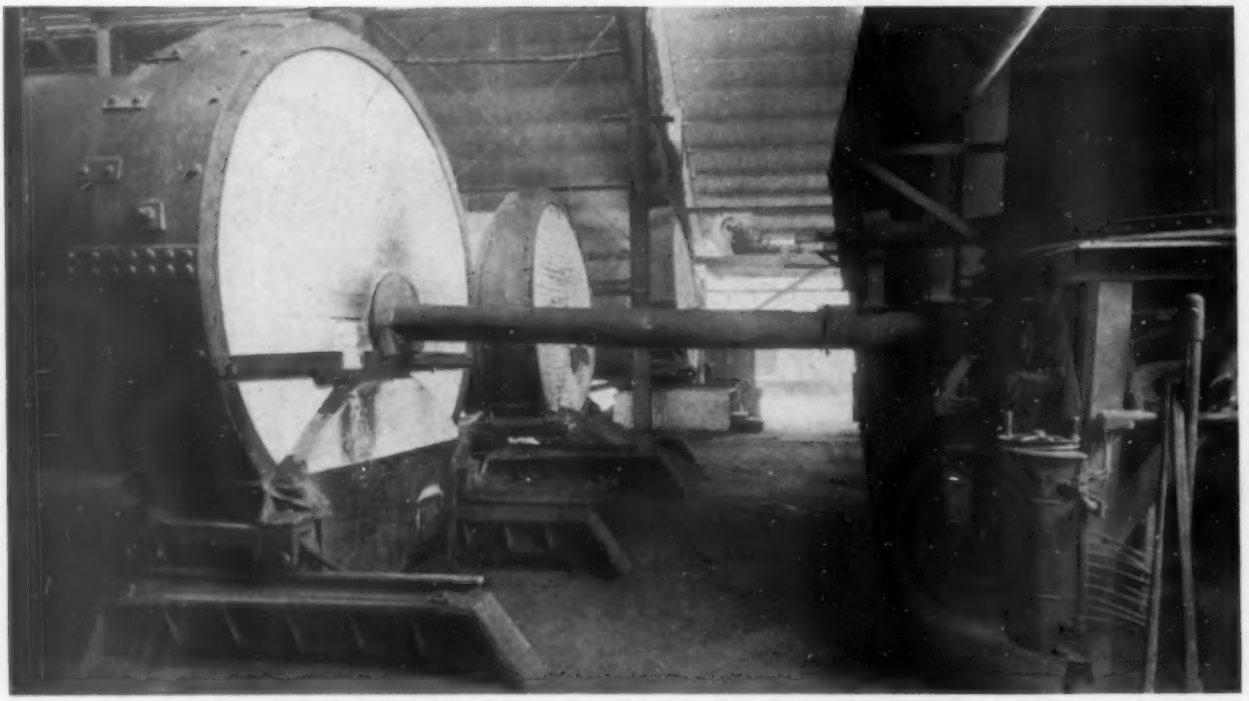
Six raw blending silos, of 700 bbl. capacity each, were built for the storage of the raw tube mill product and to provide reserves for the kiln feed. A variable speed rotary feeder proportions the raw material to a 16-in. screw conveyor, which discharges to the boot of a bucket elevator. The elevator discharge is carried direct to the kiln feed bins by screw conveyor.

Kiln Feed

The bin for each kiln has a 500-bbl. capacity. Until a few years ago, material from these bins actually "fell" into the kilns. Many surges and much flooding of the kilns necessarily took place. This condition was serious and had to be remedied. Now, the bins discharge to an 8-in. screw so arranged that material must travel up a 30 deg. incline before discharging to the kiln. This simple arrangement has eliminated many costly kiln shut-downs.

Three of the five original Mosser kilns are now being operated; one 9 x 125 ft. and two 7½ x 125 ft. The firing equipment has undergone radical changes. Formerly, air for all kilns came through a single large header pipe, branching to each kiln. This arrangement required constant attention. By simply cutting the blast to one kiln, all the others would receive too great a

LEFT—Separate grinding unit for the manufacture of high early strength cement. RIGHT—Portland cement clinker is reclaimed, after cooling, by a 100-ft. centers conveyor belt



A view of the firing floor. Individual fans now serve each kiln, displacing a centralized firing system

blast with this arrangement. Now, individual American Blower Co. fans serve each kiln.

In the past, much of the low kiln efficiency was due to the open discharge from the kilns. These are closed to keep cold air from the kilns. The coal consumption in each of the kilns already improved has been reduced 4 or 5 lb. per barrel of cement. The kiln speed has been increased about 20% and the electric motors driving all equipment have been changed from direct to alternating current. Allis-Chalmers motor and gear reducers—in a single unit—have been installed wherever possible to drive conveyors and elevators. The general tightening up of operations described and the educating of workmen have been instrumental in increasing the plant production tremendously.

Firing

Originally, five coal mills pulverized the coal for the five kilns. These units never were able to meet the kiln requirements. They were discarded a few years ago and a Raymond 4-roll mill substituted, to meet the demands of all kilns. This unit pulverizes 6 tons of coal to 92% through the 100-mesh in one hour. Hot air for this mill is taken from the clinker as it drops from the kilns to the floor below.

Not only did this installation improve the kiln efficiency, but other savings have resulted. The original mills were driven by motors totaling 200 hp. The present set-up requires a 75-hp. motor to drive the mill, a 40-hp. motor for the fan and 5-hp. for the concentrator. One man takes care of this department.

Clinker is handled in much the original way. Bucket elevators discharge hot clinker to open storage adjacent to the kiln building. Here it is moved around by a 1-yd. Sauerman bucket so that all clinker comes in contact with the atmosphere. A 180-ft. centers horizontal belt conveyor was installed to reclaim clinker from storage over a 20-in. Cincinnati belt. The conveyor discharge is raised by a bucket elevator to a 600-ton bin above the Hercules mill in the finish mill building. The conveyor is driven by a 10-hp. motor.

Generally, clinker is allowed to cool for 10 days before being moved to the hopper feeding the belt conveyor. Where gypsum was formerly shoveled by hand from cars to the foot of the elevator feeding the 25-ton gypsum storage bin, a railroad hopper has been built and gypsum is handled to the elevator by a drag.

Final Grinding

Gypsum and clinker are proportioned, on a table feeder, to the Hercules mill. The mill product allows 30% to pass the 200-mesh screen. The four tube-mill feed bins have a combined capacity of 1250 bbl. The four 5½ x 20-ft. F. L. Smidth finish mills operate in closed-circuit with a 16-ft. Sturtevant air separator. To keep dust to a minimum and make for a cleaner grinding room as well as provide an aid to a higher degree of fineness in the cement, the mills have been converted from peripheral to center discharge.

The tube mill discharge goes by screw conveyor and elevator to the separators; tailings are re-distributed by screw conveyors and elevators to the mills; and the finished product is pumped to the cement silos by a 4-in. Fuller-Kinyon system. The final product is ground to 97% passing the 200 mesh.

Before 1934, total storage of finished cement was only 50,000 bbl., in one square shed 15-ft. high. Two years ago 11 concrete silos were built, and at present 15 silos are in use. Ten of these have a capacity of 11,000 bbl. each, and one will hold 50,000 bbl.

High Early Strength Cement

"Tri-Cal," a true high early strength cement, has been manufactured since 1931. It is handled as an independent operation from the crushing plant, through the same equipment as used for the standard cement. The large kiln and half of the blending silos are set aside for the burning of high early strength clinker, and the proportions of materials fed to the mill are changed and more closely regulated. Different clays are used to increase the iron con-

tent, the sandstone percentage is raised for higher burning and an increased limestone percentage gives a higher lime content.

The combinations used are ground to the same fineness as for standard cement, through the preliminary grinding equipment. The mixture is calcined in the kiln at a temperature 300 deg. higher than for standard portland cement, with an hourly production of 28 bbl. as compared to 35 bbl. of standard.

One of the F. L. Smidth 5½ x 20-ft. preliminary tube mills has been installed outside the finish mill building as a separate unit for grinding high early strength clinker. The mill is charged with 32,500 lb. of ½-in. grinding balls. A 600-bbl. storage bin for clinker has been provided above the finish mill.

After the preliminary grind, clinker is stored in a 5000-bbl. silo, where it is allowed to cool and season for 3 or 4 weeks. It is then handled to the finish mill by elevator and screw conveyor and ground to the desired fineness. The mill temperature is kept to a minimum by spraying with water while in operation. The same 4-in. Fuller-Kinyon pump is used to place high early strength cement in storage.

Practically all improvements were made by company labor, even to the manufacture of the precast silo staves for the storage bins. The output of the three kilns is 60,000 bbl. of standard portland cement per month. The finish mill capacity is about 100,000 bbl. per month.

As was mentioned earlier, a combination of improvements has reduced the fuel consumption to 117 lb. of coal per bbl. of finished cement. This would represent about 95 lb. of the grade of coal generally purchased for the firing of kilns—already a remarkable progress in cost-cutting. The total man-hours for a season's run have been reduced about 40% and a higher quality cement is being manufactured.

Five kinds of cement are produced: standard portland, Tri-Cal, waterproof cement, low-heat cement and cement mortars in various colors. In normal cement, the initial set takes place in 2½ hours, the final set occurring in 5½ hours; the specific surface area is 1600; and strengths of 260 p.s.i. and 320 p.s.i. are attained at 3 and 7 days respectively. The initial set for Tri-Cal takes place in 1 hour 15 minutes with a final set in 2½ hours by vicat test. Strengths are 300 p.s.i. in 24 hours and 400 p.s.i. in 3 days.

Concrete Harbor Development

HURON PORTLAND CEMENT CO., Detroit, Mich., is planning the erection of six concrete silos of 65,000 bbl. cement capacity to cost $100,000, the building of a 350-ft. steel dock and construction of a railhead at Muskegon, Mich. The silos are to be constructed as a unit adjoining the dock, with pipe lines laid so that cement freighters can discharge their cargoes into the silos under compressed air pressure. The silos will be equipped with loading platforms and bagging apparatus for re-handling cement by rail and truck.

Lone Star to Expand

LONE STAR CEMENT CORP., New York, N. Y., is planning alterations and enlargements to its Houston, Tex., plant, to be completed by early summer. The capacity of the plant will be increased and several large concrete storage silos will be constructed.

Reconditioning

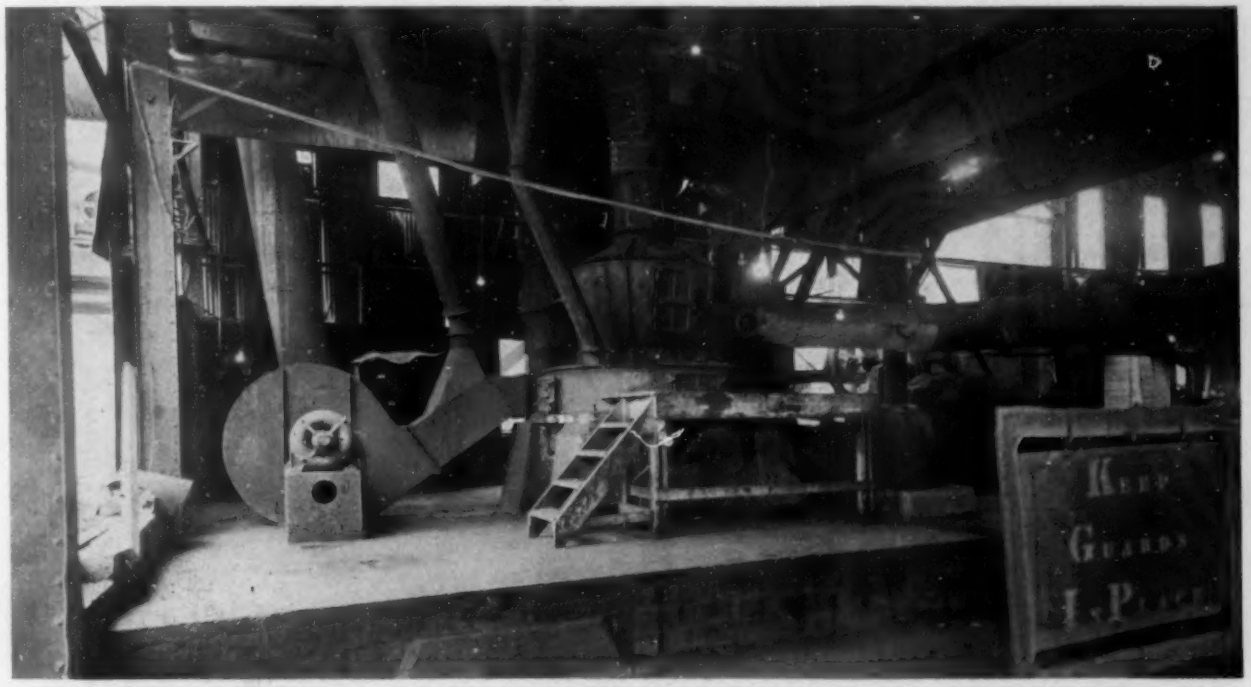
PEERLESS CEMENT CORP., Detroit, Mich., recently began reconditioning machinery and buildings at its Port Huron, Mich., plant.

Installing Equipment

MONARCH CEMENT CO., Humboldt, Kan., recently shut down the quarry, kilns and grinding departments. A number of workmen are retained to make necessary repairs and install new elevators, conveyors and other equipment, and to continue shipments from storage.

Elects Officers

OREGON PORTLAND CEMENT CO., Portland, Ore., announces the recent election of L. C. Newlands as president. Other officers chosen were H. L. Knappenberger, vice-president and general manager and Frank E. McCaslin, secretary and treasurer.



Demands for firing of all kilns are met by a single, four-roll, coal mill, which supersedes five separate smaller units

So Many Unusual Features

It's Almost Unique *Says* Edmund Shaw

OF GLACIER GRAVEL CO.

Plant Near Tacoma, Wash.

THE GLACIER GRAVEL CO.'s operation, about 15 miles south of Tacoma, Wash., has so many unusual features that it stands out as almost unique among the many plants which the writer has visited. Some of them are:

(1) Although the largest producer of sand and gravel in the Seattle-Tacoma area, it sells nothing at retail.

(2) The plant is on a main line railroad, but it makes all deliveries by water.

(3) The company has only one barge and towboat which it uses for disposing of waste and some odd jobs. The customers, all regular dealers in building materials, send their own barges and tow boats and buy f.o.b. dock.

(4) It is the only plant on tidewater in the district that washes its whole product in fresh water.

(5) Its digging method, the scraper bucket, is one that is supposed to be better adapted to producing small and medium tonnages. But this company has so arranged its digging operation that it can be used for producing large tonnages economically.

(6) The "company" is really a partnership of a father and two sons, all men who have had years of experience, and have a thorough knowledge of how the sand and gravel business is carried on in other parts of the United States.

While this is by no means a unique feature, it is unusual to find so well designed, so clean and so well kept a plant. The buildings are all painted every year.

This property was formerly worked by the State Gravel Co. and the writer visited and described it in ROCK PRODUCTS about ten years ago. The improvements made have wiped out all traces of the original plant. The present plant was constructed about six years ago.

The deposit is one of those great glacial deposits (from the Nisqually glacier) which are the envy of producers in other localities. The bank is 240 ft. high. Only 6% to 7% needs crushing, and there are practically no boulders too large for the crusher. The clay content is hardly enough to discolor the water, and all the fine sand is settled, to be mixed with other sands when the specifications demand it.

Digging Methods

There are two complete scraper bucket equipments, and the hoist houses are on skids so that they can be moved easily to dig any part of the face. The larger hoist house has a 150-hp. General Electric motor that drives a hoist built by the Washington Iron Works (Seattle). The same company built the 7½-yd. Bagley type scraper bucket.

The smaller hoist house has a 75-hp. Allis-Chalmers motor driving a Clyde Iron Works hoist. This pulls a 5-yd. Bagley type bucket, and it is also used with two Sauerman buckets, which have been found better for digging down the bank and collecting the material to where the other type of bucket can draw it in.

In front of each hoist, and mounted on the same skids, is a solidly built and braced frame that holds the sheaves for the pulling rope and the backhaul. The larger house has a cab above the roof for the operator. Both houses mount flood lights for night work.

Underground Hopper

What seems to the writer to be the most notable feature of this operation, and the one which makes it possible to operate large scraper buckets economically, is the underground receiving hopper. With this, the bucket never has to be pulled up hill, and this makes it possible to operate large buckets with not too much horsepower.

Below the hopper is a tunnel in which there is a 24-in. belt conveyor. It is about 800 ft. long, altogether, but only a short part of this, 50 ft. or so, is underground. Because of its length, the rise of the conveyor (which discharges to the crusher, set on the ground) is so gradual that a 35-hp. General Electric motor drives it.

Scalping

At the plant the material falls from the belt on a grizzly with 8-in. clear spacing. But this is so little needed that in the three weeks preceding the writer's visit only 2 cu. yd. of oversize had been thrown out by it. The undersize of the grizzly goes to the scalping screen, which is a 4x8-ft. Stephens-Adamson vibrating screen, driven by a 5-hp. Westinghouse motor. The screening medium is punched plate with square openings set cornerwise to the flow. It has been found that the size of the holes in this type must be varied

View of Glacier Gravel Co. plant and storage from pit

Two views of the barge loading equipment on Puget Sound

according to the pitch, and for a 3-in. product the variation is from 3⅛-in. to 3¼-in.

This type of screen has a considerable use on the Pacific Coast, where it is said to have originated. It is claimed that it is more efficient and that it does not blind so readily.

Throughs from this scalper go to a 34-in. conveyor, 18-deg. slope, that raises it to the sizing screens. Oversize falls to an Allis-Chalmers, Blake-type jaw crusher, 10x20-in. opening. This is in closed circuit with the scalping screen by a short conveyor that raises the crushed gravel to the first conveyor.

Sand Collecting

Water is added to the scalping screen throughs as it goes to the first of the plant screens. This is a splitting screen and it makes no final product. Its openings are ⅞-in. sq., and the oversize goes to a 1½-in. screen and the undersize to a ⅜-in. screen. The products of the 1½-in. screen go to bins and so does the oversize of the ⅜-in. screen. The undersize of this goes to a screen which has alternate sections of ⅛-in. and ¼-in. holes. What goes through this goes to sand recovery and the oversize goes to a bin.

Sand is collected in a simple but unusually efficient series of settling boxes. Before going to the first of these the sand and water going down the sand sluice meet a jet of water coming up through the bottom. This crude classifier does just what is wanted of it in sending the greater part of the fines to the top of the stream. Then the flow runs over an opening of such size that the coarsest particles with a little of the fines and some of the intermediate grains fall through it, making a coarse concrete sand that falls within the limits of the state highway specifications. By varying the force of the jet and the size and position of the hole, a considerable variation may be given the grading of the sand that is taken out.

Blending Sands

Next, the flow runs over a ⅛-in. screen in the bottom of the sluice and this removes some of the excess intermediate sizes. The amount taken out may be varied by blanking off a part of the screen. The screen undersize is plaster sand. The oversize, consisting of some coarse grains that did not go down the hole, intermediates that did not pass thorugh the screen, and all the remaining fines, go to a settling box to make building sand.

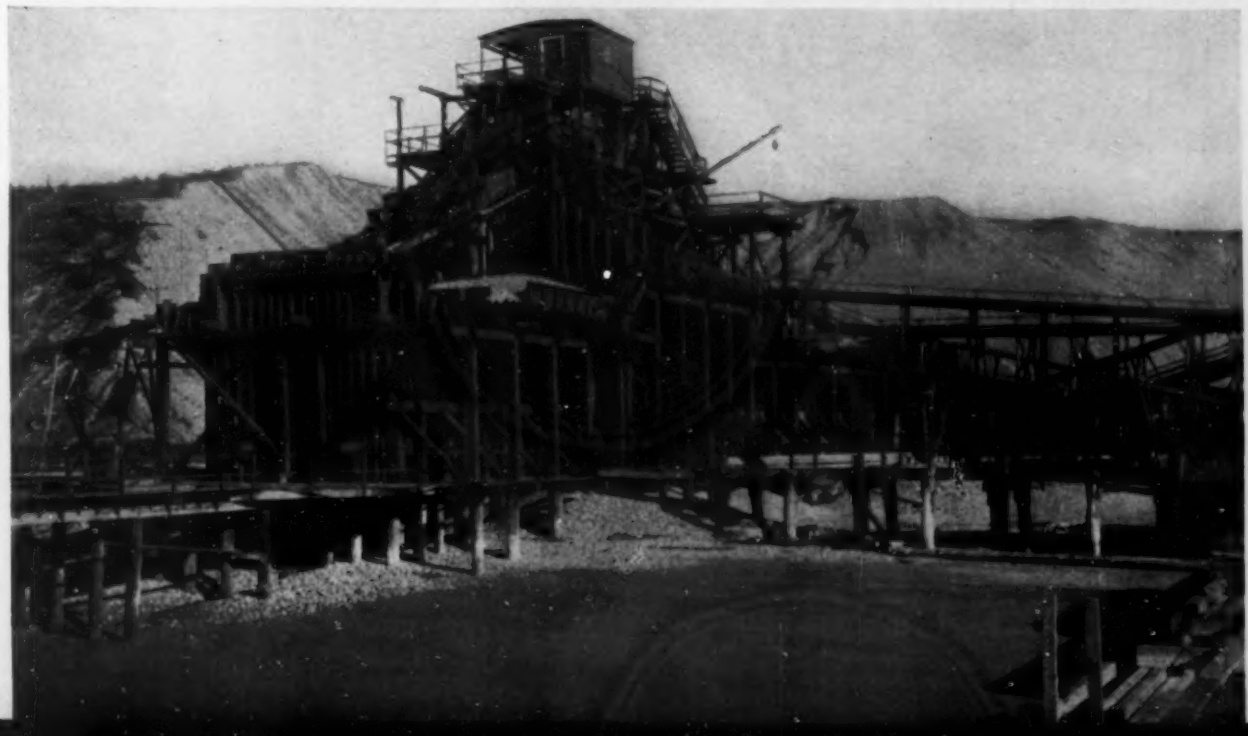
But the gradings of these settled sand products are not final for they can be mixed in any proportion as they are drawn from the bins under the settling tanks. Each bin has a gate 100 in. square, and the opening can be set to whatever size is desired by means of a lever. Each square inch of opening represents 1%. By having the sieve analyses of the products in these bins, the percentage of each size necessary for the required grading of the whole may be calculated. Of course, gradings that are not in the sands collected cannot be made, but such an arrangement allows of a wide range of variations. That so simple a system gives the excellent results it does is partly due to the nature of the sand. It settles readily and all the grains are well rounded. There is no clay to affect the settling of the fines. In many places it would be impossible to secure such satisfactory projects without mechanical classifiers.

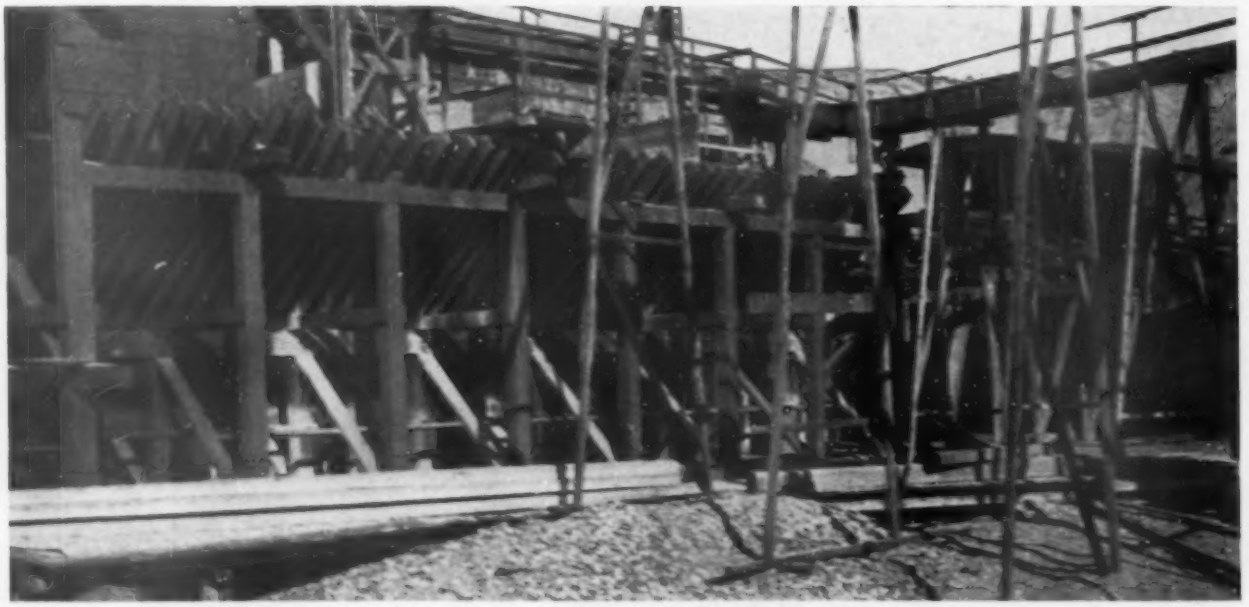
Storage

This plant has an unusually large storage as compared with its daily output, but this is one reason why it can operate steadily, the storage taking up the slack and paying it out as business decreases and increases.

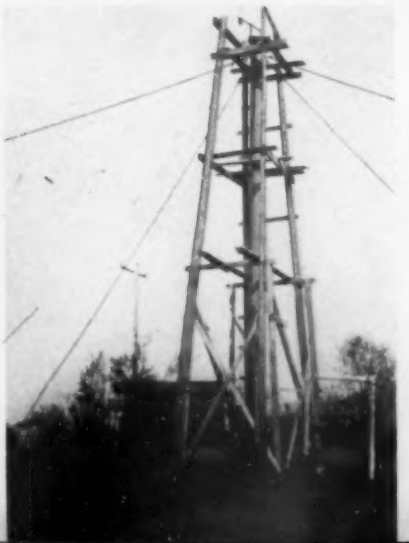
The main storage belt, carried on a

Plant of the Glacier Gravel Co. near Tacoma, Wash.





UPPER LEFT—The 800 ft. conveyor of Glacier Gravel Co. as it comes out of tunnel that leads from underground hopper. UPPER RIGHT—Pump house, and 24-in. line going over the hill. SECOND ROW LEFT—The 240-ft. bank and the No. 1 movable hoist house. SECOND ROW RIGHT—The No. 2 movable hoist house. ABOVE—The sand bins over the mixing belt. LOWER LEFT—View of crusher house and grizzly. LOWER RIGHT—Standpipe to admit air so that pipeline, when emptied, will not collapse



trestle 60 ft. above the ground, is 36 in. wide and 400 ft. long (centers). It is driven by a 75-hp. General Electric motor. The discharge is 15 tons per minute, and there are 50,000 tons of free storage in the piles, or 200,000 tons total storage. The piles are built up by a Link-Belt type tripper.

The 42-in. reclaiming belt, in a tunnel under the stock piles, is driven by a 100-hp. Westinghouse motor through a "Western" gear reducer, ratio 55 to 1. Both belts are on Rex-Stearns idlers.

Westinghouse motors and the same make of gear reducer are also used on the 42-in. belts that go to the barge loader. This is a device built by the Washington Iron Works of Seattle, a chute that moves back and forth the width of the barge being loaded. It trims the load flat, keeping the center of gravity low, making the load steadier in a seaway.

Wash Water

For years it has been the custom of the plants on Puget Sound to wash aggregates in salt water, except that plaster sand was washed in fresh water where it was available without going to too much expense. It was not an altogether satisfactory product, however, and the Glacier Gravel Co. felt that the better material justified the heavy expense of developing fresh water and pumping it. Some engineers think that washing sand and gravel in fresh water means a saving of 15% in cement.

The Chambers river is about two miles away, and a site was secured on this river. A concrete and earth fill dam 400 ft. long with a 90-ft. spillway was built, and a feature peculiar to the Northwestern states is a fish ladder 8 ft. wide to accommodate the salmon that run up to spawn.

The pump house has three pumps, two 3-stage Byron Jacksons and one Cameron. The Byron Jackson pumps have 10-in. discharges and are driven by Westinghouse 300-hp. motors. The 6-in. Cameron is driven by a 75-hp. motor. There is also a small centrifugal priming pump.

The pipe line is of steel plate, 24-in. diameter, and double-butt-welded. The highest point on the line is 440 ft. and here there is a standpipe or surge tank which allows air to enter if the pipe empties, as otherwise the pipe would collapse. It also prevents the accumulation of entrained air and "air binding."

The output of the plant is from 200 to 300 tons per hour, and at times it has exceeded 300 tons. It could easily be arranged to handle a larger tonnage if the market called for it.

The offices of the company are in the Northern Life Tower Building, Seattle.

Doubles Gravel Capacity

J. H. NAVE, Clarkston, Wash., has purchased equipment to double the capacity of his sand and gravel plant in anticipation of better business. Equipment includes a 1-yd. bucket, a 35-hp. motor and 2000 ft. of steel dragline cable. The daily capacity will be increased to 500 cu. yd.

New Gravel Concern

H. A. BECHTEL AND SON, Bellevue, Wash., recently went into the sand and gravel and contracting business. About $8000 is being spent developing the gravel pit. Two large material contracts are already on hand.

New Sand and Gravel Firm

JACKSON SAND AND GRAVEL CO., INC., Jackson, Miss., is starting the production of specification sand and gravel at Jackson under the supervision of W. R. Brown.

$22,500 Sand Plant Improvement

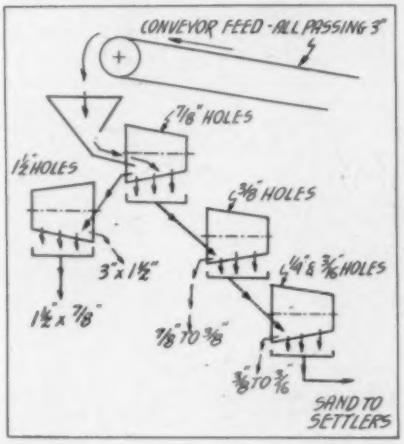
NUGENT SAND CO., Muskegon, Mich., has just completed extensions to its foundry sand plant to the extent of $22,500. A 50-ft. diameter concrete silo of 5000-ton capacity has been constructed for the storage of dried core sand. The silo is equipped with a 6-ft. x 6 ft. 6-in. reclaiming tunnel and a 24-in. belt conveyor for unloading and the shipment of sand in railroad cars. A steel tower 30 ft. square and 46 ft. high was built to house elevators and conveyors used in carrying sand from the dryers to the silos. Construction work was done by the Muskegon Construction Co., and the steel work by the Muskegon Boiler works. Link Belt conveying equipment and Goodyear belts were installed.

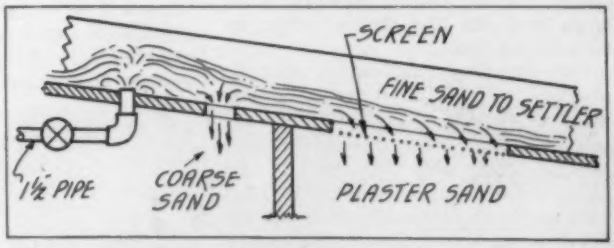
City Might Produce Gravel

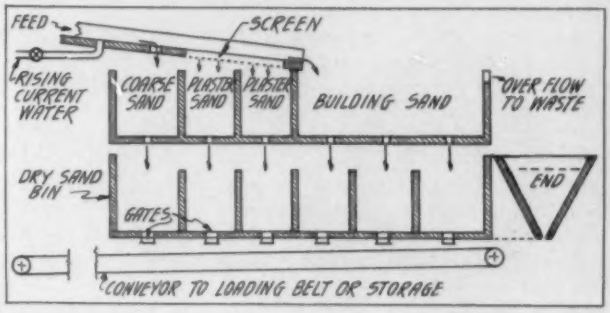
DES MOINES, IOWA, is considering going into the gravel business, claiming that local prices are too high. About 300 tons of gravel will be used daily for several months on the city streets and 7500 tons of gravel will be required on sewer projects before April 1. The city is investigating possible sources of gravel in the vicinity.

$200,000 Blaze

WARD SAND AND GRAVEL CO., Oxford, Mich., suffered damages totaling $200,000 by fire on its large dredge early in February. It is believed that considerable of the machinery was ruined. Duplicate equipment on hand will be placed into operation without delay in production. The fire was of undetermined origin.







LEFT — Diagram of screen arrangement at Glacier Gravel Co. UPPER RIGHT — Detail of sand classifier and screen. LOWER RIGHT —Sketch of sand settlers and bins

Group of sand-lime brick manufacturers at the Medfield Brick Co. plant: Center of group is Harold J. Levine, president of the Sand-Lime Brick Association

Sand-Lime Brick Industry Tending Toward Stability and Quality Product

Annual Convention at Boston, Mass., February 18 and 19 Well Attended.

THE SAND-LIME BRICK INDUSTRY, like the rest of the building material industry, has been through several exceedingly lean years, but according to all indications it is coming out of the depression with fewer but more substantial producers, who aim to manufacture none but a quality product. Another interesting development brought out at the annual meeting of the Sand-Lime Brick Association in Boston, Mass., February 18 and 19, was the addition of steam-cured cinder concrete block as a side line, which appears to be quite universal.

The discovery that cinder concrete products, as well as concrete products made from other aggregates, are far less subject to volume change when cured in high pressure steam, played right into the hands of sand-lime brick manufacturers who had had much experience in operating steam-curing drums in sand-lime brick manufacture, and much of whose equipment was idle. This concrete products end of their business bids fair to exceed in importance sand-lime brick manufacture.

Officers Reelected

HAROLD J. LEVINE, president, National Brick Co., Long Island City, N. Y., was reëlected president of the association, and J. Morley Zander, Saginaw Brick Co., Saginaw, Mich., was reëlected secretary-treasurer.

Plant Research

FREDERICK S. SNYDER, president, Atlantic Brick Co., Watertown, Mass., in his address of welcome to the convention, as chief host, gave an example of the progressive character of the reviving sand-lime brick industry. Mr. Snyder is a successful business man, a past-president of the Boston Chamber of Commerce, who is finding pleasure and profit in tackling the problems of a new business. With him is associated his son, L. W. Snyder, as vice-president, and Chester H. Carmichael, one of the old timers in the sand-lime brick industry, as production manager.

The Atlantic Brick Co. uses a washed sand exclusively, employing a Link-Belt "Rotoscoop" to recover the fines, so that a clean, well-graded sand is assured. The result is a very white brick and a very smooth one. Sand and lime are proportioned on Hardinge conveying, weighing feeders, the mixture being placed in silos with sufficient moisture to thoroughly hydrate the lime. After storage for a day or more the mixture is ground in a Hardinge rod mill and fed to the brick presses.

The company is researching and experimenting with colored face brick and with white and cream colored face brick in which white portland cement is also used. To add the color or white cement in accurate proportions to the mixture on the way to the rod mill a "Syntron" vibrating feeder is used.

These refinements at the Atlantic Brick Co. plant, which were examined with much interest by the visiting sand-lime brick manufacturers, are typical of the trend in the industry toward making manufacture a precise and carefully controlled operation, that of course being the way to a constant quality product.

Lime

J. M. Murray, chief chemist, Warner Co., Philadelphia, Penn., discussed informally the subject of lime. Particularly he cautioned users of lime against specifying such high quality as to put the product on a premium basis, if they could satisfactorily use one of lesser specification requirements. Many factors affect the quality of lime—hard-burning, soft-burning, impurities, etc. Mr. Murray thought that for sand-lime brick manufacture purchasers should not specify less than 1% silica or/and ½% iron oxide. He said up to 1½% of magnesia was not harmful, if the lime were properly burned. Altogether, the limit on impurities need not be less than 4% or 5%.

Mr. Murray then went on to explain that the greatest variations in lime were in physical characteristics, particularly the rate of slaking. Rotary-kiln lime was usually more rapid slak-

ing than vertical, or shaft, kiln lime made from the same stone, he said. The treatment lime receives after leaving the lime plant also has its effect on quality, when it comes to be used.

Should Get More Cooperation

THOS. H. LINEAWEAVER, Grays Ferry Brick Co., Philadelphia, Penn., expressed the thought that the National Lime Association should be more helpful both in research and in promotion of sand-lime brick. He also objected to the classification of lime for use of sand-lime brick manufacturers as "chemical" lime, which gave it a high freight rate. He thought the lime manufacturers should help in getting a lower rating, since the price of the lime to the brick manufacturer represented 20% of his costs.

Weathering

DR. LANSING S. WELLS, National Bureau of Standards, Washington, D. C., spoke informally on sand-lime brick tests, the results of which have not yet been published.

Mortars and Bricks

PROF. W. C. VOSS, Massachusetts Institute of Technology, whose research work on brick mortars has been such an important factor in restoring lime mortar to a place of esteem by architects, spoke informally on the characteristics of good brick. He did not appear to be very familiar with sand-lime brick, but expressed fear of volume change because like concrete they are a synthetic product. He then went on to explain that volume change in mortars, the shrinkage of the mortar away from the brick, was the cause of leaky brick walls.

Prof. Voss recommended a brick with not less than 3% or 4% and not over 10% absorption. He also explained that the rate of absorption was important. For clay brick it is very rapid; it should be less for well-made sand-lime brick. He then spoke of the importance of good workmanship and well filled joints, if brick walls are to be satisfactory.

In conclusion, he expressed the belief that the virtue of lime in mortar was the conversion of calcium hydrate, or hydroxide, to carbonate, the crystals of which prevented further expansion and contraction of the cement, or calcium silicate, gel.

He said he was not ready yet to approve sand-lime brick as face brick but would approve it for back-up masonry.

Plant of the Medfield Brick Co., Medfield, Mass.

Building Codes

EDWARD ROEMER, building commissioner of Boston, described at some length the rudiments of building laws, with particular reference to Boston, where, under a new act now pending in the legislature, all the specific details of the law will be written and changed when necessary, as well as interpreted, by a board of technical experts.

Lime Mortar

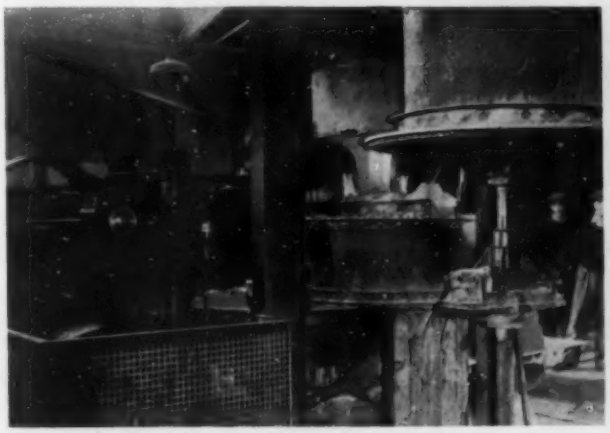
DR. L. S. WELLS returned to the subject of lime mortars, raised by Prof. Voss, to give the results of some of the Bureau of Standards investigations and research. The chief point he made was that there are vast differences in limes, and that the kind of lime selected—whether or not it made plastic putty—was fully as important as the proportions of lime and cement upon which Prof. Voss laid such great stress.

Association's Future

J. MORLEY ZANDER, Saginaw Brick Co., Saginaw, Mich., spoke of the advantages of the association to its members and of the difficulty of increasing its activities with such a small revenue.

Building Outlook

NATHAN C. ROCKWOOD, editor of ROCK PRODUCTS, spoke briefly on the outlook for commercial and residential building, emphasizing particularly the trends toward fire-safe construction and the promotion of such types by strong groups of building material manufacturers.



Lucke (German) sand-lime brick presses at Medfield plant

Hardinge rod mill for grinding and mixing sand and lime

Plants Visited

Members and guests visited the plants of the Atlantic Brick Co., Watertown, and the Medfield Brick Co., Medfield. The latter plant is one of the newest and most efficient in the industry.

Registration

J. H. Bibby, Medfield Brick Co., Medfield, Mass.

C. H. Carmichael, Atlantic Brick Co., Watertown, Mass.

W. P. Coady, Winchester Brick Co., Winchester, Mass.

Wm. F. C. Dall, Northern Brick Co., South Bend, Ind.

J. Finkbeiner, Michigan Pressed Brick Co., Detroit, Mich.

B. L. Foresman, receiver, Boice Bros., Pontiac, Mich.

W. A. Fortunato, Paragon Brick Co., New York City.

John J. Gallagher, Winchester Brick Co., Winchester, Mass.

Phillip H. Gallagher, Winchester Brick Co., Winchester, Mass.

Jack Garcia, National Brick Co., Long Island City, N. Y.

C. H. Handy, Sagamore Duntile Co., Sagamore, Mass.

R. L. Hamaker, Warner Co., Philadelphia, Penn.

Emil Hansen, Paragon Plaster Co., Syracuse, N. Y.

Wendell A. Hodgkins, Hoosac Valley Lime Co., Adams, Mass.

R. G. Inge, New England Lime Co., Adams, Mass.

F. S. Lash, Jackson and Church Co., Saginaw, Mich.

Thos. H. Lineaweaver, Grays Ferry Brick Co., Philadelphia, Penn.

Harold J. Levine, National Brick Co., Long Island City, N. Y.

Geo. Macpherson, Paragon Brick Co., New York City.

A. C. Marggraff, Acme Brick Co., Milwaukee, Wis.

C. A. Perkins, Northern Brick Co., South Bend, Ind.

Nathan C. Rockwood, Rock Products, Chicago, Ill.

F. S. Snyder, Atlantic Brick Co., Watertown, Mass.

L. W. Snyder, Atlantic Brick Co., Watertown, Mass.

Walter Schmeck, Berlin Brick and Sand Co., Berlin, N. J.

Louis Tallman, Jackson and Church Co., Saginaw, Mich.

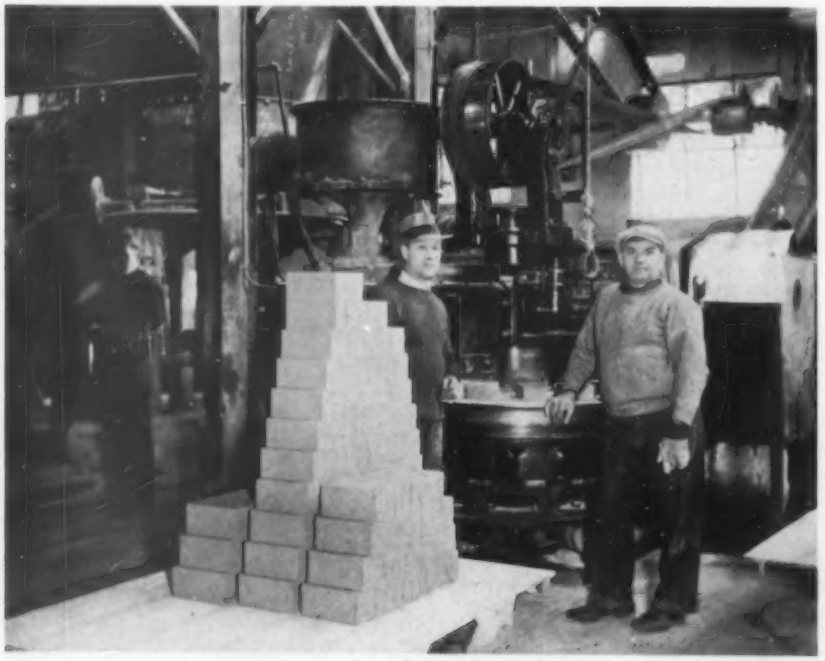
P. Varaturo, Medfield Brick Co., Medfield, Mass.

Prof. W. C. Voss, Massachusetts Institute of Technology, Cambridge, Mass.

Dr. Lansing S. Wells, National Bureau of Standards, Washington, D.C.

Frank T. Whelan, Block & Brick, Inc., Detroit, Mich.

J. Morley Zander, Saginaw Brick Co., Saginaw, Mich.



Another view of the brick press of the Medfield Brick Co.

Sues Gravel Firm

Dolese Brothers Co., Oklahoma City, Okla., has been sued for $25,000 by the parents of a 15-year-old boy who, allegedly, was killed by one of the company's trucks several months ago.

New Main Office

Richmond Sand and Gravel Corp., Richmond, Va., has changed the location of its principal office from 434 W. York St., Norfolk, Va., to 3011 Dock St., Richmond, Va.

Sand-Lime Brick Production and Shipments

The following data are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States. They may be considered representative of the industry.

Nine active sand-lime brick plants reported for the month of January, this number being three less than that reporting for the month of December, statistics for which were published in February.

Average Prices for January

Shipping Point	Plant Price	Delivered Price
Pontiac, Mich.	$11.00	$13.50
Grand Rapids, Mich.	10.71	....
Detroit, Mich.	....	15.00
Mishawaka, Ind.	9.25	....
Syracuse, N. Y.	14.00	16.00-20.00
Saginaw, Mich.	10.50	....

Statistics for December and January

	December†	January*
Production	4,126,835	2,088,190
Shipments (rail)	284,000	97,000
Shipments (truck)	3,558,948	1,532,370
Stocks on hand	2,195,240	2,240,971
Unfilled orders	3,127,500	1,820,000

† Twelve plants reporting; incomplete, three not reporting unfilled orders.

* Nine plants reporting; incomplete, one not reporting unfilled orders.

Sand-Lime Block

One producer reported production of 65,000 sand-lime block during January, with truck shipments totaling 53,811 and stocks on hand 11,189, with unfilled orders for 6000 block. The price for 8-in. block averaged 12c; that for 12-in. block, 16c.

Ice Damages Dredge

Consumer Sand Co., Topeka, Kan., suffered serious damages to its large dredge when ice jams broke on the Kansas river recently and swept it from its moorings. The pipeline was salvaged but several pontoons were swept away.

Bankruptcy

Universal Sand Co., New Castle, Penn., has filed bankruptcy proceedings under Section 77-B of the Bankruptcy Act. A trustee will be appointed on March 5.

Would Build Crushing Plant

Sylvan Crest Sand and Gravel Co., Trumbull, Conn., has petitioned the local zoning board of appeals to permit construction and operation of a rock crushing plant. Residents have opposed the plan, claiming that blasting would be injurious to their homes and that trucks would jeopardize the safety of school children.

OPENING A NEW QUARRY

Canada Crushed Stone Co. Has Longer But Still Economical Haul

By Bror Nordberg

THE HAULAGE system from quarry to crusher at the Dundas, Ont., plant of the Canada Crushed Stone Co., Ltd., has been completely modernized since the operation was last described in these columns.

In review, it might be stated that this plant is the largest crushing unit in Canada, with a daily capacity in excess of 4500 tons. The plant is a hillside operation that has crushed stone from a quarry on the crest of the hill above the plant since operations started in 1910. The present plant was constructed in 1922 to replace the original one, destroyed by fire that year. An overburden increasing steadily in depth as quarrying progressed in the hillside was responsible for installation of the new haulage system simultaneously with the opening of a new quarry.

Increasing Overburden

When operations first started in 1910, only 3 ft. of overburden had to be removed to work a 70-ft. face. When abandoned a year ago, about 20 to 25 ft. of overburden was removed and a 40-ft. face was worked. The old quarry had reached the point where it was considered impracticable and unprofitable to operate.

At the time this operation was last described in ROCK PRODUCTS (April 9, 1932), the opening of a new quarry some distance from the first one was being considered, with the possibility of electric haulage to the crushers. This plan has now been fully realized.

In the past, all rock was hauled to the crusher by six 20-ton saddle-tank locomotives. A train-load consisted of eleven 4-yd. side-dump cars carrying an average of 44 tons, to the crusher. Cars were hauled a distance of from 600 to 2000 ft. on 36-in. gauge track. The first step toward electrification took place in 1931, when a 4-yd. Bucyrus-Erie 120-B full revolving electric shovel was placed in the old quarry to load rock in place of 3-yd. steam shovels.

Opening a Quarry

In 1933 and 1934 the hauling equipment in the old quarry was electrified. Late 1934 witnessed the driving of a right-of-way from the old quarry to the new, and in May, 1935, the line was completed to the new quarry. The old quarry was abandoned a year ago, and work is now proceeding in opening up the new one. Normal plant operations were not interfered with at any time during the change-over.

At present, the shovel is operating at a location 9500 ft. from the primary crusher. In November, 1934, the company drove a cut from the old quarry for the right-of-way to the new. The grade line was laid out to give every advantage to loaded trains.

Hauling equipment consisting of an electric locomotive with 12-yd. dump body which hauls three 12-yd. Western air dump cars for use in this work. Trolley wire on the dump is supported by steel poles attached to 16-ft. ties in the track. When track is thrown the trolley line moves with it. A 1-yd. gasoline shovel made the pilot cuts ahead of the track-laying, loading into trucks. The 4-yd. electric 120-B shovel followed up behind to load cars. About 45 ft. was the highest cut made. It is estimated that over 300,000 cu. yd. of material was moved, most of which was placed for fill. The right-of-way was started in December, 1934, and was finished in May, 1935, with track-laying operations following up directly. Work was carried on throughout the coldest weather.

The new deposit occupies a square 2000 ft. on a side, with an estimated tonnage of 12,000,000 down to a 40-ft. floor. A quarry floor of 40 ft. has been set to utilize natural drainage from the quarry to a creek near its entrance.

Removal of from 2 to 5 ft. of overburden uncovered 1½ million tons of stone in the quarry of Canada Crushed Stone Co., Dundas, Ont.

The shovel shown is loading at a point 9500 ft. from the crusher. Note the concrete footings for trolley poles. About 2000 ft. of double track were laid, with a right-of-way of from 80 to 150 ft. Eventually, double track will be installed over the full length of haul

ABOVE—An average of 60 tons of rock is hauled to the crusher in one trainload of standard 20-yd. cars

BELOW—Loading one train with rock, while a second train waits on a siding. When the quarry is completely opened, trains will complete a circuit to the crusher without any waiting

Overburden averaging from 2 to 5 ft. has been removed, uncovering 1,500,000 tons of stone.

At present the electric shovel is operating on a 20-ft. face, which was reached in two 10-ft. cuts. When the quarry is completely opened up, it will have a face of 40 ft. and the railway will leave the quarry at floor grade and continue level for about 4500 ft., followed by stretches of 1 to 2% grade in favor of the load to about 700 ft. from the crusher, where it again becomes level. The locomotives develop their greatest tractive effort while going up the stretch of 2% grade empty.

Blasting

Already 250,000 tons of rock have been removed from the new location since last summer. Six-inch blast holes are drilled by Cyclone drills 2 ft. below the quarry floor. These are drilled 12 ft. back from the face and 10 ft. apart. A 60% dynamite is used for through cuts and 60% in the bottom with 40% deck charges when blasting down the face. Cordeau-Bickford fuse is used as a detonator.

The haulage right-of-way ranges from 80 to 150 ft. in width. Fully 2000 ft. of double track have been laid and two sidings are provided at other points. The track is fitted with spring switches to keep a one-way track open. Eventually, a double-track will be provided for the full distance.

Haulage equipment consists of four trains, each pulled by a 35-ton electric locomotive. Each car and the locomotive is equipped with two 10-yd. Easton Phoenix side-dump bodies. Each locomotive hauls two trailers, and carries 60 tons of rock to the crusher. The trailers are standard 20-ton cars, 27 ft. in length and the locomotives are 35 ft. long. Only one man is required to operate a train.

The locomotives are equipped with side-arm pantographs, operated by air, and have straight and automatic standard railway air brakes. Power is supplied by four 50-hp. Westinghouse traction motors, one driving each axle. An electric air compressor on the back of the locomotive supplies air at 110 p.s.i. to operate the brakes, the pantographs, the sanders and the whistle. The locomotives have a speed ranging from 8 to 25 m.p.h. and under present schedules make a round trip including loading, hauling, dumping and return in 30 minutes.

A trolley line of catenary construction on poles at 150-ft. centers is carried along the side of the track, 9 ft. from the track center line to the quarry entrance. Two 4/0 copper feeders are carried on the same poles, one going the entire distance and the other 5000 ft.

At the quarry entrance a direct suspension 2/0 grooved trolley is carried on wood poles set in 2-ft. cubes of concrete and placed approximately at 60-ft. centers. Steel rings in the concrete enable the poles to be moved easily when shifting track. Trolley voltage is 600 and drops at the quarry to less than 50 volts.

Power Equipment

A power house was installed to house equipment for transforming incoming power to direct current for driving the locomotives. This structure is 35 ft. x 50 ft. and 32 ft. high, of concrete block construction. Shop and plant offices are to be erected adjacent to the power house in the near future.

The electrical equipment consists of two Westinghouse 300-kv.a. motor generator sets, together with necessary switchboard equipment. Each set consists of a 440-hp., 2200-volt synchronous motor and a 300-kv.a. 600-volt d.c. generator. Either or both of the generator sets can be operated, according to load requirements.

Electric current for the plant is brought in at 12,000 volts and is transformed down to 2200 volts for the motor-generator sets and to 440 volts for the plant motors. The primary 12,000-volt line has been carried to the quarry, where it is stepped down to 2200 volts for the shovel and 220 volts for the drills.

The plant, being near to Niagara Falls, has the advantage of low rates for electric power. The rate is about 1c per horsepower-hour. Haulage under the new system has already proved to be cheaper for a 9500-ft. haul than 1800 ft. was by steam.

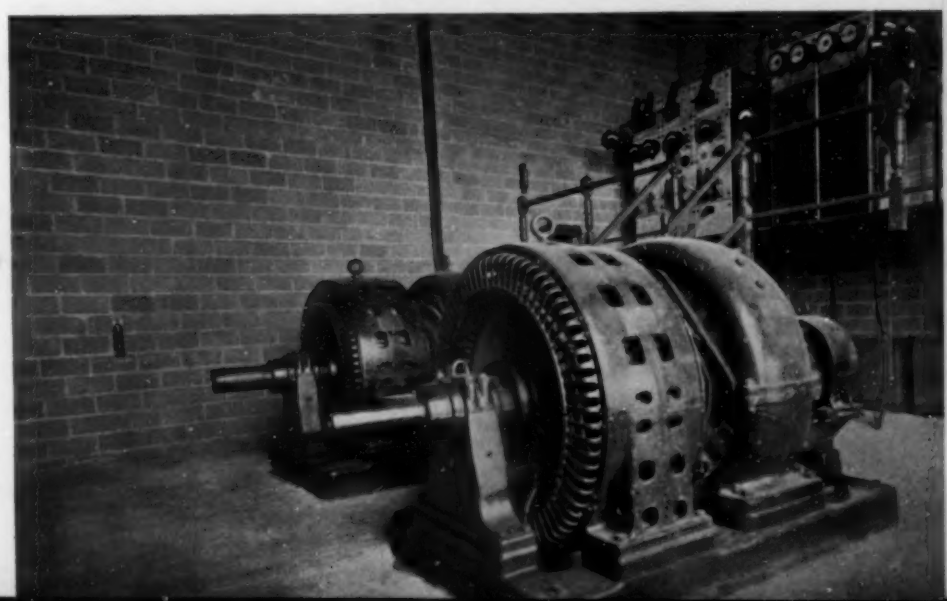
Flexibility, of course, in haulage by rail, is restricted as compared to truck haulage, which is out of the question for such large tonnages and long distances.

When the quarry is completely opened up, a track will run around it in a complete loop so that cars will be loaded and sent on their way in one direction, without any sidetracking.

At present the quarry is being worked down to a 20-ft. level. About 12 million tons of stone will have been removed when the 40-ft. floor is worked out

ABOVE—The train, when loaded travels at a rate of from 8 to 25 miles an hour. It makes a complete circuit to the crusher in 30 minutes

BELOW—Direct current electrical power for the locomotives is converted by two motor generator sets. Electricity is conducted to the quarry at 12,000 volts, where it is transformed to 2200 volts for the shovel and 220 volts for the drills. The power house is of concrete block construction



To Produce Agricultural Limestone

PELLA LIMESTONE CO., Pella, Iowa, was recently organized and purchased the limestone quarry formerly operated by Ira Toom. New equipment is being installed to produce 200 tons of agricultural limestone daily. Farmers will be able to purchase such stone at the quarry or delivered on the farm and will receive the benefits of free soil testing service from the company to determine the amount of limestone needed per acre.

Chemists' Corner

Inter-Relationship Between Physical Characteristics of Concrete Aggregates

By J. C. Sprague,
Assistant Engineer, U. S. Engineer Office, Angola, Ind.

THE THREE PHYSICAL CHARACTERISTICS of aggregates that the engineer is concerned with, when designing concrete mixtures, are specific gravity, unit weight and percent voids. These three characteristics of fine and coarse aggregate are dealt with more or less continuously on any job, large or small, where concrete is one of the construction materials.

Specific gravity[1] is the most important characteristic in this "triumvirate"; it is essential when mixtures are to be scientifically designed—and if mixes are arbitrarily assumed it is necessary to know the specific gravity of the materials before the concrete yield may be determined.

Because of pore spaces in the individual particles of an aggregate, bulk[2,3,4] (sometimes referred to as "apparent") specific gravity is generally used. To get a proper conception of the term "bulk" specific gravity, imagine a single piece of rock surrounded by a watertight and weightless membrane having zero thickness. If P is the weight of that rock in a dry condition in air and Q is the weight of water which is displaced by the membrane-surrounded rock, then the bulk specific gravity is $\frac{P}{Q}$. The so-called "over-flow" method (described on p. 23, Bulletin No. 1216, U. S. Department of Agriculture) makes use of this calculation when Q is caused to overflow by the immersion of the sample which has previously been watersoaked and surface dried, thus causing the same water displacement as would occur were the specimen surrounded by a theoretical membrane. The A.S.T.M. methods, D55-25 and C68-30[5] and A.A.S.H.O. method T-84[7], for determining specific gravity of fine aggregate, are based on the overflow method.

If apparent[2,3] specific gravity is used (variously referred to as specific gravity and "true" specific gravity) it is necessary that a correction be made for the percentage of absorption[2,3,8] of the material. An example will serve better to clarify this.

Suppose we are using a unit of 100 lb. of dry sand, the bulk specific gravity of which is 2.6, apparent specific gravity 2.66, and absorption 0.86%. If we divide 100 by the bulk specific gravity times weight of water (62.4) we obtain 0.616 cu. ft., which represents the actual volume occupied by the particles with the pores sealed. On the other hand, if we use apparent specific gravity the result will be a volume of 0.602 cu. ft., which is the absolute volume of the solid rock matter in the 100-lb. sample—that is, the first result (0.616) less the volume of pore space within the aggregate particles. If we now add to 0.602 cu. ft., the volume of pore space (vol. of water absorbed $= \frac{100 \times 0.0086}{62.4} = 0.014$ cu. ft.) we obtain the same result in each case. Hence $0.602 + 0.014 = 0.616$. When wet aggregate is dealt with, bulk specific gravity should be determined on a saturated surface-dry basis. Quite often, when the aggregate is dense, it makes no appreciable difference whether the test is made on a wet or dry basis if there are no delays in the determination.

The unit weight[6] and percent voids[7,3,9] of a material of course vary inversely with each other. This relationship, and the fact that the weight of a material depends upon its density, or specific gravity, has caused to be developed an equation[10,11] showing the inter-relationship between specific gravity, unit weight and percent voids, as follows:

$$62.4\ VS = 62.4S - W$$

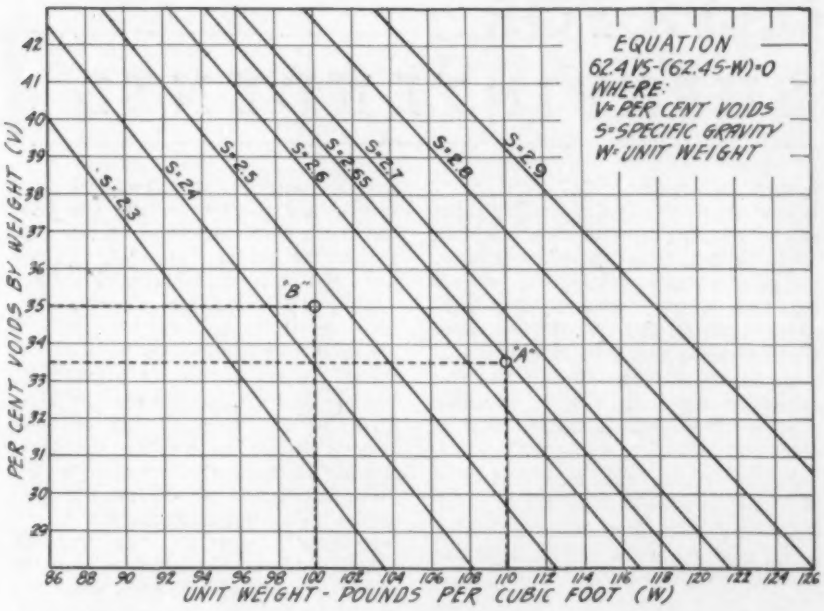
Where: V = percentage of voids by weight
S = bulk specific gravity
W = unit weight per cu. ft.
62.4 = weight in lb. per cu. ft. generally used for water.

Use of Chart

This equation has been utilized in plotting percent voids against unit weight, for different bulk specific gravities, ranging from 2.3 to 2.9. The accompanying chart illustrates the manner in which this was done. Suppose, for instance, that a material has a percentage of voids of 33.5 and a bulk specific gravity of 2.65, and the unit weight is required. By drawing a line (A) from 33.5% on the ordinate axis to where it intersects the curve for 2.65 (specific gravity), and then dropping the line vertically from this intersection to the abscissa axis, it is found that the unit weight per cu. ft. is 110 lb. If the unit weight and specific gravity are known the procedure would be reversed; or if the unit weight and percent voids were known, the specific gravity could be determined from their point of intersection.

In the laboratory, where facilities are available for determining these physical characteristics of concreting aggregates, the above equation is of significance mainly as a check on the values determined. For instance, suppose the time allotted for a given set of tests precludes the possibility of making check determinations for specific gravity, and/or voids and unit weight; and yet it is important that the values obtained be accurate. By applying the above equation, or a variation of it, $62.4\ VS - (62.4S - W) = 0$, one side of the equation sign should equal the other side (or zero). If the two sides of the equation sign are not in equilibrium it is evident that an error has been made in the determination of one or more of the values obtained. If the error is negligible, a correction may be made for the unit weight since this characteristic is more subject to error of measurement than either of the other two. On the other hand if the individual determinations do not check within reasonable limits in their inter-relationship, further tests should be made on each to determine the source of error.

It should be borne in mind that it is possible to use this equation as a check only when actual physical tests are made, and not when the value of one physical characteristic is calculated from the values of the other two. For instance, the equation would not be applicable if the percent voids of coarse aggregate were determined in accord-



Plot of voids percentages against unit weight for various bulk specific gravities

ance with A.S.T.M. Method C30-35T [8]. A commonly used field test to determine the percent voids of an aggregate is described as follows:

Fill a cubic foot measure with the aggregate, reduce it to the desired compaction (usually in accordance with A.S.T.M. method C29-27[4]), and weigh. Fill the interstices between particles of rock with water at normal temperature, allowing it to enter the measure from the bottom, and weigh. This weight, minus the original weight, is the weight of water which occupied the voids between the aggregate particles, and is divided by the unit weight of water per cu. ft., to obtain percentage of voids. This method may also be applied to fine aggregate, but it is recommended that a smaller measure be used and that extreme care be exercised in making the test so that voids will be thoroughly filled. The divisor, of course, will have to be changed to meet conditions.

If complete laboratory facilities are not available, as is often the case on small jobs, it is possible to calculate one of the values from the other two. For instance, if the only equipment available is a watertight cubic foot measure and a set of platform scales, it is possible to determine the unit weight and percentage of voids of the material by test, and the specific gravity by calculation, as follows:

$$S = \frac{W}{62.4 - 62.4\,V}$$

by referring to the chart, the specific gravity may be determined graphically. If the percent voids happens to be 35, and the unit weight 100 lb. per cu. ft., lines (B) from the two values may be drawn, and their point of intersection will give the specific gravity. By interpolation, the specific gravity in this case is 2.45; by calculation, the value is

$$\frac{100}{62.4 - 21.8} = 2.46$$

Applied to Fine Aggregates

In working with fine aggregate, where the unit weight and percent voids are determined in accordance with A.S.T.M. Standard Methods [4,9], trouble may be encountered in making the individual determinations check in their inter-relationship. This is because fine aggregate when compacted in the standard manner, is generally not as compact as when inundated. In order to compare the unit weight of such a material with its void content, and both these values in relation to the specific gravity, it is necessary that the same degree of compaction obtain in each case. The unit weight of the inundated sand (minus the water), in which the voids have been determined (A.S.T.M. C69-30), may be calculated as follows [10]:

$$W = \frac{\dfrac{W_s}{28{,}317\ 400}}{453.59}$$

Where: W = unit weight of fine aggregate
W_s = weight in grams of fine aggregate used in A. S. T. M. test C69-30.

In this manner the unit weight and percent voids of inundated fine aggregates have been determined from the same sample and should therefore check in the equation for inter-relationship of physical characteristics.

The inter-relationship of the three physical characteristics discussed in the foregoing has significance in that it definitely ties the separate values together for an aggregate of a given degree of compaction. As soon as the degree of compaction changes, the unit weight and the percent voids change, one varying inversely with the other.

References

1. Standard Definitions of Terms Relating to Specific Gravity, A.S.T.M. Designation: E12-27, A.S.T.M. Standards, 1933, part 2, p. 1252.
2. Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate, Method T-84, Standard Specifications, Am. Assn. of State Hgy. Officials, p. 99.
3. Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate, Method T-85, Std. Spec. A.A.S.H.O., p. 101.
4. Standard Method of Test for Approximate Apparent Specific Gravity of Fine Aggregate, A.S.T.M. Designation: C68-30, A.S.T.M. Standards, 1933, Part 2, p. 242 (Same as method T-84, section 6).
5. Tentative Method of Test for Absorption by Aggregates for Concrete, A.S.T.M. Designation: C95-33T, A.S.T.M. Book of Tentative Standards, 1933, p. 433.
6. Standard Method of Test for Unit Weight of Aggregate for Concrete, A.S.T.M. Designation: C29-27, A.S.T.M. Standards, 1933, part 2, p. 247.
7. Standard Method of Test for Determination of Voids in Fine Aggregate for Concrete, Method T-20, Std. Spec. A.A.S.H.O., p. 103.
8. Tentative Method of Test for Determination of Voids in Coarse Aggregate for Concrete (Dry Rodded), A.S.T.M. Designation: C30-35T, Proc., A.S.T.M., Vol. 35, pt. 1, p. 846 (1935).
9. Standard Method of Test for Approximate Percentage of Voids in Inundated Fine Aggregate, A.S.T.M. Designation: C69-30, A.S.T.M. Standards, 1933, pt. 2, p. 250.
10. J. C. Sprague, "Basic Steps in Control of Concrete," Concrete, May, 1934.
11. J. C. Sprague, "Field Tests for Specific Gravity, unit weight and voids of Concrete Aggregates," Bulletin, Am. Soc. for Test. Mat'ls., December, 1935.

Lease Limestone Mine

JACOB KRIER and GEORGE H. MORRIS, the former of Gladstone and the latter of Bismark, N. D., are reported to have leased a limestone (calcite) mine on Deer Creek, near Big Timber, Mont. Chicken grits will be the product first made.

Addendum

M. J. GROVE LIME CO., Frederick, Md.: The crusher shown in the prize photographs of James H. Grove, Jr., published in ROCK PRODUCTS, January, 1937, page 58, was furnished by McLanahan & Stone Corp., Hollidaysburg, Penn. Shown very clearly in the top photograph, it has aroused the interest of readers.

HINTS AND HELPS FOR SUPERINTENDENTS

A Cure for Rough Kiln Tires

By C. H. SONNTAG.

Plant Manager, Lawrence Portland Cement Co., Thomaston, Maine

ROTATING machines such as kilns, coolers, dryers, sand and gravel washers and equipment of like nature are usually carried on tires, or riding rings, supported by rollers, commonly called trunnions. If the rotation is slow, as with kilns and coolers, and if the tires and trunnions are properly lined up with each other, the surfaces of both will remain smooth. But when rotation is rapid, and if the revolving machine is not very heavy, the tires may develop transverse corrugations. When these once form they go from bad to worse, and performance may become so rough that both machine and foundation are shaken.

This condition seems most apt to arise when each tire rests on four rollers carried in rocker arms. In this design the rocker arms or cradles can be aligned as a unit, but the individual rollers can not. If in addition the rollers are made of white or chilled cast iron, conditions are likely to be aggravated, because such rollers are apt to have soft spots, especially over spokes.

Smoothing up the face of a tire by machining in place is an expensive job and not very satisfactory, because the center of rotation is not fixed after the tire has become rough, even if it is carried on new rollers.

The writer remembers hearing many years ago that tires in this condition could be trued up by the continuous action of abrasive blocks, but can not say now where the idea originated. Correspondence with one of the abrasive manufacturers brought a statement that they knew nothing of this way of smoothing up tires, and it appeared that a little experimenting was in order.

By the time our coal dryer was three years old its tires had become so rough that everything about it was shaking badly, and one of the anchor bolts was broken. We bought some carborundum blocks, size 8 in. x 4 in. x 4 in., grade 16-HD, and arranged them in frames to ride on top of the tires, four blocks to the tire, the length of the block being transverse to the tire. We found that the weight of the blocks and frame was not great enough to cause very rapid cutting, and so we weighted them down with pieces of rails and shafting. Of course any other weight would do as well. The arrangement is shown in accompanying view. The edges of the carborundum blocks may be seen below the frame. Position on top of the tire is maintained by ropes to the building walls. The frame is kept from sliding off the tire by steel guides welded on the sides.

After proper weighting, the tops of the corrugations were removed in a surprisingly short time, and the dryer ran much more smoothly. In less than a year the places where the corrugations had been could hardly be noticed.

After the tires are smoothed up, wear on them and on the abrasive blocks is very slow. The faces of the blocks are apt to become glazed with cuttings and grease, and once or twice a year we wash them off with kerosene. Wear is so slow that we leave the blocks in place permanently to prevent a possible recurrence of the trouble that caused their original application.

It would be natural to say that the corrugations corresponded in number with the teeth in the girth gear, but actually there was no correspondence. We do not know the true cause of their formation, but the carborundum blocks were a sure and cheap cure.

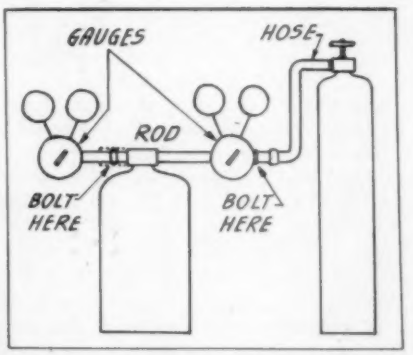
Arrangement for keeping kiln tires smooth with abrasive blocks

Saving Oxy-Acetylene Gauges

By M. W. EDMAN,

American Aggregates Corp., Oxford, Mich.

WORKMEN, after removing oxygen and acetylene gauges from one set of cylinders to move them to another location, permit them to dangle at the end of their respective hose, with the result that the glass faces become broken and permit dirt and dust to enter into the mechanism.



Gauges are less easily broken when bolted to an iron rod

This trouble may be avoided by bolting each gauge to a rigid iron rod in a convenient position, so that the acetylene gauge may be attached to the acetylene cylinder in the regular manner, with a short hose going from the oxygen gauge to the oxygen cylinder near by.

Testing Gravel Deposit

J. W. HIGGS, chief engineer, Gifford Hill & Co., Dallas, Tex., in his U. S. Bureau of Mines Information Circular 6910, on "Mining, Treatment, Methods, and Costs at the Hoot Spur Plant," describes the method of testing a sand and gravel deposit as follows:

The general method for testing a piece of property is as follows: A row of holes approximately 400 ft. apart is drilled across the property. If no gravel is found, holes are bored 18 to 20 ft. deep before they are abandoned. When gravel is encountered spacing is reduced to 200 ft. or less, or to whatever interval is necessary to determine accurately the limits of the deposit. The first row of holes is paralleled by another row 200 or 400 ft. apart, as may be required, and this process is continued until the limits of the gravel are fairly accurately determined. All holes are numbered and marked with stakes.

Field Analyses

Regardless of whether or not the gravel as located is considered workable, a map is made of all gravel land tested, and the location of all test holes is accurately plotted. As shown in Fig. 1, the irregular spacing and the fact that holes are generally put down without regard to property lines or direction give these test maps a haphazard appearance.

A full-time employe, who is an engineer, works with the testing crew and does the necessary surveying, mapping, etc., and takes care of the field analyses of the samples. After the limits of the gravel have been located in the field and mapped, the approximate yardage of pit-run gravel is computed. This information and screen tests of the material permit a rough approximation of the character and volume of salable material. For this computation the following formula is used:

$S = A \times d \times 1{,}200$

S = salable material, in cu. yd.,
A = area of deposit, in acres,
d = average depth, in ft.

A special testing machine mounted on a trailer is used in boring holes. This machine consists of a 22-in. auger driven by a gasoline engine, and it will bore through ordinary overburden at a rate of 3 to 5 ft. per min. In sand, gravel, loose sand, or other material with little binder frequent cave-ins make its use very difficult if not impossible. In such cases the auger is used only to drill through the overburden, and when the gravel is reached an ordinary flap-valve bailing bucket is used. Two light A-frames, built of 2-in. by 6-in. lumber and hinged at the top, form an easily collapsible derrick. After the drill is pulled an 8-in. casing is set in the hole, and the bailing bucket is raised and dropped by one or two men pulling on a 1-in. rope run through a sheave at the top.

Usually the impact of the bailing bucket alone will break up the gravel, but in conglomerate or other material that is difficult to break a section of 56-lb. rail about 10 ft. long and having a sharpened end is used ahead of the bucket. To obtain an accurate sample, great care is taken to see that the casing is driven ahead of the bucket. With an improvised drop hammer weighing about 250 or 300 lb. the casing is driven about 2 ft. ahead, or as far as practical at a time, depending on the material. All material, including water removed from the hole, is dumped into a watertight box where the fines are permitted to settle before the water is poured off. The sample is reduced to proper size for further testing by the usual method of quartering. A sample comprises all material taken from each 5-ft. drive of the casing.

The following information is obtained from the sample in the field:

(1) Percentage of clay and silt.
(2) Careful screen analysis.
  (a) Percentage of sand minus ¼ in.
  (b) Percentage of gravel.
  (c) Percentage of salable material.

The method used for determining the quantity of silt is as follows: The sample is dried to a constant weight; it is then placed in a pan and covered with water. The mixture is vigorously agitated and the muddy water poured off. This process is continued until the water poured off is clear. The sample is then dried and weighed. The second weight is subtracted from the original weight, and the difference represents the weight of clay and silt. This weight, divided by the original weight and multiplied by 100, gives the percentage of clay and silt.

Cost of Tests

To determine friable and unsound particles, specific gravity, and absorption, other samples are sent to a commercial laboratory.

The cost per day of the testing crew, as outlined above, is about as follows:

1 foreman (also surveyor or engineer)		$ 5.00
1 truck driver and drill operator		4.00
3 to 5 laborers @ $3.00		12.00
Total cost of labor		$21.00
Truck (oil, gas, depreciation, etc.)	$4.00	
Drill (oil, gas, depreciation, etc.)	1.50	5.50
		$26.50

The footage of hole drilled and bailed per day varies so greatly that an average can only be obtained by considering an extended period. From August, 1934, to August, 1935, the cost per foot of hole drilled was $0.52. This amount included total depth of holes drilled with machine and bailer; clearing necessary for moving the rig in timber; and cost of engineering for surveying, plotting, and sampling.

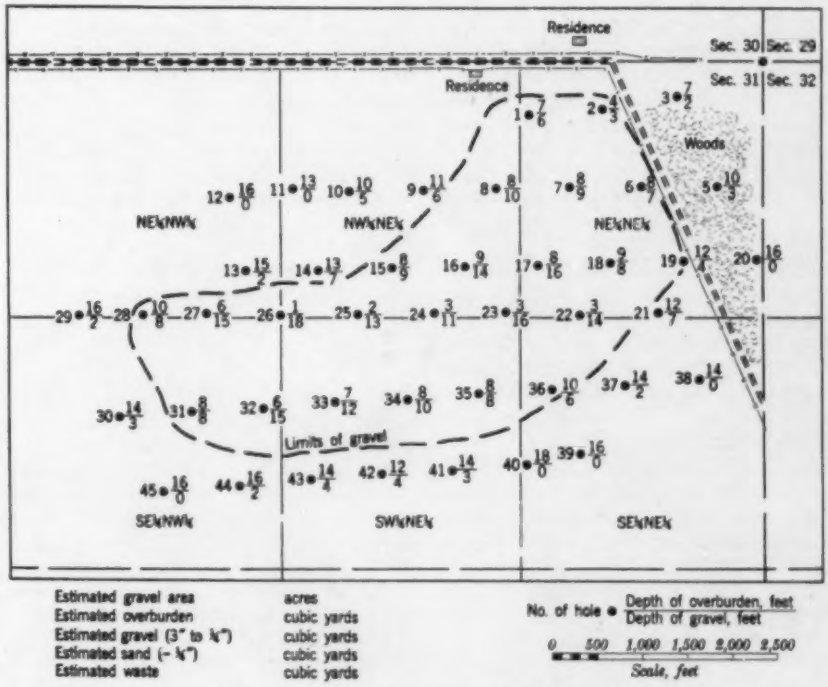


Fig. 1—Drill hole map of typical gravel deposit

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividends
Aetna P. C., cap.[51]	2-23-37	17	..	
Allentown P. C. (Penn.), com.[51]	2-23-37	8	10	
Allentown P. C. (Penn.), 6% cum. pfd.[52]	2-23-37	9	..	
Alpha P. C., com.	2-27-37	35⅝	actual sale	.25 (qu.) Mar. 25
American Aggregates, 1st mtg., 3/6's, 1943, new bonds[48]	2-18-37	50	..	
American Aggregates, 6's, 1943, old[48]	2-18-37	50	..	
American Aggregates, com.[48]	2-18-37	3	4	
American Aggregates, pfd.[48]	2-18-37	15	..	
Arundel Corp., com.	2-26-37	20⅝	actual sale	
Ash Grove L. & P. C., com.[51]	2-23-37	13	..	
Ash Grove L. & P. C., pfd.[53]	2-23-37	98	..	
Bessemer L. & C., com.[48]	2-18-37	14	15	
Bessemer L. & C., cert. of dep., 1947[48]	2-19-37	94	..	
Bessemer L. & C., 1st 6½'s, 1947[48]	2-18-37	95	..	
Bessemer L. & C., 6's, 1955[53]	2-23-37	95	..	
Boston S. & G., com.[37]	2-18-37	2⅝	3⅝	
Boston S. & G., 7% pfd.[37]	2-18-37	13	..	
Boston S. & G., 7's, 1939[37]	2-18-37	80	..	
Calaveras Cement, com.[40]	2-15-37	7⅞	11⅜	
Calaveras Cement, 7% pfd.[40]	2-26-37	99	100	
California Art Tile, A	2-26-37	22¼	24⅝	.25 (ac.) Mar. 1
Canada Cement, com.[42]	2-22-37	18½	18⅝	
Canada Cement, pfd.[42]	2-22-37	109⅝	..	1.00 (ac.) Mar. 20
Canada Cement, 4¼'s, 1951[42]	2-22-37	103½	104¼	
Canada Crushed Stone, 5½'s, 1944[42]	2-22-37	103	..	
Carolina P. C., 8% cum. pfd.[53]	2-23-37	25	..	
Consol. Cement, A[53]	2-23-37	12½	13½	
Consol. Cement, 1st 6's, 1950[50]	2-24-37	91 F	93 F	
Consol. Oka. S. & G., 6½'s, 1948[52]	2-22-37	20	..	
Consol. S. & G. pfd.[51]	2-24-37	..	65	
Consol. Rock Products, units[50]	2-24-37	1¼	1½	
Coplay Cement Mfg., pfd.[50]	2-24-37	15	..	
Coplay Cement Mfg., 6's, 1941[50]	2-24-37	90	..	
Cumberland P. C., 7's, 1937[50]	2-24-37	100½	..	
Cumberland P. C., units[51]	2-23-37	54	..	
Cumberland P. C., pfd.[50]	2-24-37	61	63	
Dewey P. C., com.[51]	2-23-37	56	..	
Dolese & Shepard	2-27-37	53	56	
Federal P. C., 6½'s, 1941[51]	2-23-37	48½	50½	
Fla. P. C., units[50]	2-24-37	50	51	
Fla. P. C., 6½'s, 1937[42]	2-19-37	100	101	
Giant P. C., com.[50]	2-24-37	7	8	
Giant P. C., pfd.[50]	2-24-37	22	24	
Glens Falls P. C., com.[53]	2-23-37	12	18	
Glens Falls P. C., pfd.[53]	2-23-37	88	94	
Great Lakes P. C., A[51]	2-23-37	7½	..	
Gyp., Lime & Alabastine	2-26-37	14⅜	16½	
Gyp., Lime & Alabastine, 5½'s, 1948[42]	2-22-37	102	102⅝	
Hawkeye P. C., cap.[50]	2-24-37	33½	36½	
Hercules Cement, com.[51]	2-23-37	40	..	
Hercules Cement, pfd.[50]	2-24-37	99	..	
Hermitage P. C., com.[51]	2-23-37	17	20	
Hermitage P. C., pfd.[51]	2-23-37	108	117	
Ideal Cement, com.[50]	2-27-37	90	93	
Kelley Island L. & T.	2-27-37	28⅝	actual sale	
Ky. Rock Asphalt, 6½'s, 1936[46]	2-19-37	35 F	..	
Keystone P. C., pfd.[51]	2-23-37	30	..	
Lawrence P. C., com.	2-27-37	47	49	
Lawrence P. C., 5½'s, 1942[50]	2-24-37	101½	102¼	
Lehigh P. C., com.	2-27-37	48⅜	actual sale	
Lehigh P. C., 4% pfd.	2-26-37	..	195	1.00 (qu.) Apr. 1
Lone Star Cement, com.	2-27-37	66½	actual sale	.75 (qu.) Mar. 30
Louisville Cement	2-23-37	200	250	
Lyman-Richey, 1st 6's, 1939-40[51]	2-23-37	50	..	
Marbelite Corp., com.[40]	2-15-37	35c	45c	
Marbelite Corp., pfd.[40]	2-15-37	4¼	4⅝	
Marblehead Lime, 7's, 1944[44]	2-18-37	94	..	
Marquette Cement, com.	2-27-37	52	55	
Marquette Cement, pfd.[50]	2-24-37	98	..	
Material Service Corp.[50]	2-24-37	18½	21	
McCrady-Rodgers, A[50]	2-24-37	8	10	
McCrady-Rodgers, B[50]	2-24-37	7½	9½	
Medusa P. C., com.	2-27-37	55	actual sale	
Medusa P. C., 6% cum. pfd[53]	2-23-37	85	..	
Michigan L. & C., com[50]	2-24-37	45	..	
Minnesota Mining & Mfg. Co.	2-23-37	38	38⅜	
Missouri P. C.	2-27-37	24¾	25⅝	
Monarch Cement, cap.[53]	2-23-37	99	..	
Monolith P. C., com.	2- 4-37	3⅛	3½	
Monolith P. C., 8% pfd.	2- 4-37	7¼	8¼	
Monolith Portland Midwest, 8% pfd.	2- 4-37	2⅛	2⅝	
National Gypsum, A., com.	2-26-37	74⅝	actual sale	
National Gypsum, 1st pfd.	2-27-37	104½	105½	
National Gypsum, 5% pfd.	2-27-37	15	16	
Nazareth Cement, com.[50]	2-24-37	12	..	
Nazareth Cement, 7% pfd.[50]	2-24-37	99	..	
Newaygo P. C., pfd.[51]	2-23-37	90	..	
New England Lime, units[54]	2-18-37	16	..	
N. Y. Trap Rock, 1st 6's, 1946	2-27-37	90	actual sale	
N. Y. Trap Rock, 6's, stamped, 1946	2-27-37	94	actual sale	
N. Y. Trap Rock, 7% pfd.[46]	2-19-37	80	90	
North Amer. Cement, 1st 6½'s, 1953	2-26-37	62	64	
North Amer. Cement, 6½'s, 1943	2-26-37	100	102	
North Amer. Cement, 6½'s, 1946[50]	2-24-37	85	..	
North Amer. Cement, "A" pfd.	2-26-37	12½	14	
North Amer. Cement, com. A	2-26-37	6	8	
North Amer. Cement, "B" pfd.	2-26-37	15½	17½	
North Shore Mat., 1st 6's[50]	2-24-37	65	..	
Northwestern States P. C.[50]	2-24-37	28	30	
Ohio River S. & G., com.	2-23-37	1	..	
Ohio River S. & G., 1st pfd.	2-23-37	78	..	
Ohio River S. & G., 2nd pfd.	2-23-37	5	..	
Ohio River S. & G., 6's[46]	2-19-37	9	12	
Oregon P. C., com.[40]	2-15-37	4	4⅝	
Oregon P. C., pfd.[40]	2-15-37	97	..	
Oregon P. C., conv. pfd.[50]	2-24-37	53½	55	
Pacific Coast Aggr., new com.[40]	2-26-37	4	4	
Pacific Coast Cement, com.	2- 4-37	3½	..	
Pacific Coast Cement, 1st pfd.	2- 4-37	45	..	
Pacific P. C., com.[40]	2-15-37	7⅝	8¼	
Pacific P. C., pfd.[40]	2-26-37	58½	60	
Peerless Cement, com.[50]	2-24-37	9¼	9⅝	
Penn.-Dixie Cement, com.	2-27-37	9⅜	10⅛	
Penn.-Dixie Cement, pfd. A	2-27-37	67	69	
Penn.-Dixie Cement, 6's, A, 1941	2-27-37	100½	100¾	
Penn. Glass Sand Corp., v.t.c.	2-27-37	26½	27	
Penn. Glass Sand Corp., pfd.[51]	2-23-37	120	..	
Penn. Glass Sand Corp., 1st mtg. 4½'s, 1960	2-26-37	105⅝	..	
Petoskey P. C., com.[51]	2-23-37	13¼	14¼	
Republic P. C., com.[51]	2-23-37	10½	11½	
Republic P. C., pfd. (7% cum.)	.....	..	..	.50 Mar. 15, 1937
Republic P. C., 6's, 1943[50]	2-24-37	103	..	
Riverside Cement, A	2-26-37	18¾	19⅝	
Riverside Cement, B	2- 4-37	2⅝	3¼	
Riverside Cement, 1st pfd.	2- 4-37	99	..	
Rockland & Rockport Lime, com.[51]	2-23-37	1½	..	
Schumacher Wallboard, com.	2-26-37	7½	8⅛	
Schumacher Wallboard, pfd.	2-26-37	24½	25½	.50 (ac) Feb. 15
Signal Mt. P. C., com.[50]	2-24-37	2½	4½	
Signal Mt. P. C., pfd.[50]	2-24-37	70	..	
Signal Mt. P. C., units[51]	2-23-37	74	..	
Southern States P. C., cap.[51]	2-23-37	40	..	
Southwestern P. C., units[50]	2-15-37	175	..	
Spokane P. C., units[50]	2-24-37	12½	..	
Standard Pav. & Mat., com.[42]	2-22-37	6½	7½	
Standard Pav. & Mat., pfd[42]	2-22-37	..	48	
Superior P. C., A[40]	2-26-37	46¼	50	
Superior P. C., B[40]	2-26-37	19½	20½	
Trinity P. C., units[50]	2-24-37	50	..	
U. S. Gypsum, com.	2-27-37	124½	125⅛	
U. S. Gypsum, pfd.	2-27-37	166	actual sale	
Volunteer P. C., 1st 7's, 1942[46]	2-19-37	90	95	
Volunteer P. C., units[46]	2-19-37	75	100	
Vulcanite P. C., com.[48]	2-18-37	9	12	
Vulcanite P. C., 7½'s, 1943[46]	2-19-37	92⅝	93⅝	
Wabash P. C.[50]	2-24-37	10	12½	
Warner Co., com.[50]	2-24-37	12½	..	
Warner Co., pfd.[50]	2-24-37	24	28	
Whitehall Cement Mfg., com.[53]	2-23-37	95	..	
Whitehall Cement Mfg., pfd.[53]	2-23-37	50	..	
Wisconsin L. & C., 1st 6's, 1940[54]	2-18-37	70	..	
Wolverine P. C., com.	2- 4-37	7	8¼	
Yosemite P. C., 4% pfd.[40]	2-15-37	5	5½	

Quotations by [36]The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Marsh Judge, Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [50]Rogers & Tracy, Inc., Chicago, Ill. [53]Paul D. Sheeline & Co., Boston, Mass.

F = Flat.

Recent Dividends Announced

California Art Tile, A (accum.)	$0.25	Mar. 1, 1937
Lehigh P. C., 4% pfd. (quar.)	1.00	Apr. 1, 1937
Lone Star Cement, com.	.75	Mar. 30, 1937
Penn. Glass Sand Corp., $7 pfd. (quar.)	1.75	Apr. 1, 1937
Republic P. C.	.50	Mar. 15, 1937
Schumacher Wallboard, pfd. (accum.) (This leaves arrears of $9)	.50	Feb. 15, 1937

DOLESE AND SHEPARD CO., Chicago, Ill., crushed stone producer, reports for the year ended December 31, 1936 a net profit of $39,902, equal to $2.08 a capital share, as compared with net loss of $4,626 for 1935. Current assets totaled $187,729 at the end of 1936, against current liabilities of $113,630. On December 31, 1935, current assets amounted to $203,011, against current liabilities of $70,938.

◇ ◇ ◇

MICHIGAN SILICA CO., Rockwood, Mich., has filed a registration statement with the SEC covering 155,000 shares of common stock, par value $1. According to the statement, holders of the 115,000 shares of the present common capital stock will surrender them and accept in exchange 115,000 shares of the company's $1 par common stock. William C. Roney & Co., the principal underwriter, will offer 40,000 shares of common publicly at $2.75 a share. The underwriter also has options on 15,000 shares of the common which is outstanding and will offer such stock publicly from time to time at the prevailing market price. The balance, 100,000 shares, will not be offered at present. Proceeds obtained from the sale of 40,000 shares of common stock will be devoted to the retirement of the outstanding 8% non-cumulative preferred stock and to payment of certain obligations incurred in connection with plant additions. Profit and loss statement for the 8 months ended August 31, 1936, shows a net profit of $39,028 after all charges and provision for federal income taxes. No provision has been made for surtax on undistributed profits.

◇ ◇ ◇

NATIONAL GYPSUM CO., Buffalo, N. Y., has called a special meeting of stockholders for March 23 to vote on a plan to eliminate the present class "A" and "B" stocks and substitute a new common stock of $1 par. The plan, if approved, will authorize 2,500,000 shares of common, four shares of which will be exchanged for each share of the class "A" and six shares will be exchanged for each share of the class "B." The approval of the plan will mean there will be only one class of common stock and each share will have equal voting power M. Baker, president, stated the plan contemplates the elimination of the present closely held control and extension of voting rights to all holders of common stock and a wider stockholder interest in the company. In the past, he said, the company's common stock was not acceptable for listing on the New York Stock Exchange because of the small number of voting shares. It is expected that immediate listing on the exchange can be had after this plan becomes effective, he added.

◇ ◇ ◇

UNITED STATES GYPSUM CO., Chicago, Ill., reported current assets as of December 31, 1936, including $11,279,239 cash and marketable securities of $21,764,041 and current liabilities $3,261,942, compared with cash and marketable securities of $14,001,152, current assets of $21,184,236 and current liabilities of $1,913,501 at the end of preceding year. Inventories were $5,682,567 against $3,954,290.

Consolidated income account for year 1936, compares as follows:

	1936	1935
Earnings after expenses	$8,055,296	$5,547,341
Other income	391,249	405,896
Total income	$8,446,545	$5,953,237
Other deductions	92,215	86,066
Depreciation and depletion	2,054,217	1,917,557
Federal income taxes, etc.	947,000	458,362
Surtax and undistributed profit	25,000	.....
Net income	$5,328,113	$3,491,252
Preferred dividends	547,554	547,554
Common dividends	3,576,335	2,085,447
Surplus	$1,204,224	$858,251

◇ ◇ ◇

LAWRENCE PORTLAND CEMENT CO., New York City, reports for the year ended December 31, 1936, certified by independent auditors, a net income of $328,132 after interest, depreciation, depletion, federal and state income taxes including $20,000 surtax on undistributed profits, equal to $4.37 a share on 75,000 no-par shares of capital stock. This compares with net loss of $71,418 in 1935. Working capital as of December 31, 1936, amounted to $1,210,313 as compared with $1,013,938 on December 31, 1935.

◇ ◇ ◇

WOLVERINE PORTLAND CEMENT CO., Coldwater, Mich., reports for the calendar year 1936 a net income of $11,240, equivalent to 11c a share on the 98,691 shares of common stock outstanding, compared with net income of $2,426 or 2c a share on the like amount of common stock outstanding for 1935. Sales for 1936 totaled $430,824, compared with $324,615 in the preceding year. Current assets as of December 31, 1936, were $395,673, while current liabilities amounted to $14,410.

PETOSKEY PORTLAND CEMENT CO., Petoskey, Mich., reports a consolidated income account for the year ended December 31, 1936, as follows:

Net sales	$1,858,980
Cost of sales	1,067,894
Selling, administration and general expense	309,656
Depreciation and depletion	137,365
Operating profit	344,065
Other income	42,895
Total income	386,960
Interest, etc.	68,559
Other deductions	20,041
Provision for taxes	45,826
Net profit	252,534
Surplus, Jan. 1	191,557
Surplus adjustments, net	648
Surplus, Dec. 31, 1936	443,444
Times interest earned	5.64
Earned per share	1.27

Net loss for 1935 was $35,930.

Current assets, as of December 31, 1936, were $676,980 and current liabilities $233,602.

◇ ◇ ◇

GIANT PORTLAND CEMENT CO., Philadelphia, Penn., reported for the year ended December 31, 1936, a net profit of $55,757 after depreciation, federal and state income taxes, federal surtax on undistributed profits, and other charges, equal to $1.71 a share on 32,548 shares of $3.50 preferred stock on which there are accumulated dividends. This compares with net loss of $47,249 in 1935.

Income accounts compare as follows:

	1936	1935
Operating profit	$107,296	$40,276
Depreciation	36,951	87,525
Federal taxes	*14,587	.....
Net income for year	55,757	(d)47,249
Earned per share, pfd.	$1.71	.....

*Includes $7,120 Federal undistributed profits tax.

◇ ◇ ◇

OREGON PORTLAND CEMENT CO., Portland, Ore., reports for the year ended December 31, 1936, a net profit of $153,864 after all charges, including depreciation, depletion and taxes. Comparative results for 1935 are not available. The company reports net sales of 474,370 bbl. of cement during the year, including 58,423 bbl. to Bonneville dam. In 1935 total sales were 514,351 bbl., including 206,263 bbl to the dam.

◇ ◇ ◇

AMERICAN LIME AND STONE CO., Bellefonte, Penn., reports for the calendar year 1936 a net income of $29,291, equal to $2.93 each on 10,000 common shares, against net income in 1935 of $31,698, equal to $4.53 each on 7,000 shares of 6% preferred.

◇ ◇ ◇

PENNSYLVANIA GLASS SAND CORP., Lewiston, Penn., reports for the nine months ended September 30, 1936 (partly estimated and subject to annual audit), a profit of $400,783 after depreciation, depletion and interest but before federal income taxes and surtax on undistributed profits. This showing reflects losses due to floods in Pennsylvania and Maryland in March, 1936.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of February 20:

Trunk

35366 (Sup. 1). **Ground limestone,** C. L., min. weight 60,000 lb., from Oriskany Falls, N. Y., to Centre Village and Oneonta, N. Y., $1.35, Windsor and East Windsor, N. Y., $1.45 per net ton, canceling same rates from Munns, N. Y. Reason—Production shifted from Munns, N. Y., to Oriskany Falls, N. Y.

Sup. 1 to 35453. **Sand,** C. L., (See Note 2), from Toms River, Pinewald and South Lakewood, N. J., to Brockville, Ont., 26½c per 100 lb.

35482 Cancel rates on **stone,** crushed, **slag** and **gravel,** coated with oil, tar or asphaltum, C. L., from Charleston, W. Va., district, to various points in West Virginia.

35484. **Crushed stone** and **screenings,** in straight or mixed carloads. (See Note 2), from Monocacy, Penn., to Nitro, W. Va., $4.20 per net ton.

35489. **Stone, natural** (other than bituminous asphalt rock), crushed, C. L., (See Note 2), from Oaks Corners, N. Y., to Reading Centre, Watkins Glen, Wedgewood, Wentz, Moreland, Beaver Dams, Chambers, Post Creek, Ferenbaugh and Corning, N. Y., 90c per net ton.

35500. **Talc tailings, soapstone,** carloads, minimum weight 70,000 lb., from Hailesboro, Emeryville and Natural Bridge, N. Y., to Suchs, N. J., 17c and Ernston, N. J., 18c per 100 lb.

Sup. 1 to 35500. Talc tailings, C. L. **soapstone,** ground or pulverized, other than soapstone testing not less than 99% through 200 mesh screen, C. L.; **soapstone,** crude, not ground or pulverized (not blocks or slabs), C. L., minimum weight 70,000 lb., from Marriottsville, Md., to Suchs, N. J., 14c, and Ernston, N. J., 12c per 100 lb.

35510. **Sand** (other than ground or pulverized or naturally bonded molding) and **gravel,** in open top cars, without tarpaulin, C. L., (See Note 2), from Morristown, Succasunna and Netcong, N. J., to various points in Pennsylvania, rates ranging from 80c to $1.50 per net ton. Reason—Based on Lycoming scale.

35540. **Crushed stone** and **crushed stone screenings,** in open top cars, C. L., (See Note 2), from Hillsville, Shaw Jct., and Walford, Penn., to Ravenswood, W. Va., $1.80 per net ton, and to Millwood, W. Va., $1.90 per net ton. Reason—Based on joint Buckland scale.

35543. **Stone, natural** (other than bituminous asphalt rock), crushed, uncoated, C. L., (See Note 2), from Jamesville, N. Y., to Port Crane, N. Y., $1.20; to Tunnel, Harpersville, Centre Village and Nineveh, N. Y., $1.30; Unadilla and Wells Bridge, N. Y., $1.40, and Oneonta, N. Y., $1.50 per net ton. Based on the Lycoming scale.

35556. **Ground limestone,** C. L., minimum weight 60,000 lb., from Oriskany Falls, N. Y., to various points on the D. & N. R. R., rates ranging from $1.80 to $1.95 per net ton.

35559. **Sand,** naturally bonded molding, in open top or closed cars, C. L., (See Note 2), from Northumberland, N. Y., to various points in Massachusetts, New York and Vermont, rates ranging from 80c to $1.80 per net ton. Reason—Based on I. C. C. Dkt. 22907 scale.

35566. To amend rates on **limestone,** ground or pulverized, stone dust and marl, C. L., minimum weight 60,000 lb., from all points of origin in Trunk Line territory to all points on the Stewartstown Railroad by increasing said rates 25c per net ton. Reason—Based on I. C. C. Docket 25220.

35574. **Crushed stone,** C. L., (See Note 2), from Bethlehem, Penn., to South Plainfield, N. J., $1 per net ton.

35576. **Feldspar, flint and ore, barytes,** C. L., minimum weight 60,000 lb., from Egansville, Ont., to Genesee Dock, N. Y., 19½c per 100 lb.

35581. **Limestone,** other than ground or pulverized, C. L., (See Note 2), from Annville, Brownstone, Hummelstown, Myerstown, Palmyra and Swatara, Penn., to Tottenville, N. Y., $1.75 per gross ton.

35590. **Syenite, nepheline,** crude of ground, C. L., minimum weight 60,000 lb., from Lakefield, Ont., to Connellsville, Penn., Mt. Vernon, Ohio, 28½c; Jeannette, Charleroi and Creighton, Penn., 27½c per 100 lb.

35596. **Slag,** C. L., (See Note 2), from Sparrows Point, Md., to Quantico, Va., $1.30 per net ton.

Central

49490. To establish on **roofing granules** (silica), C. L., min. wt. 60,000 lb., from Brittain and Copley, O., to Buffalo, N. Y., 210c; Chicago, Chicago Heights, Ill., 250c; Cincinnati, O., Detroit, Mich., 185c; East St. Louis, Ill., 335c; Franklin (Warren Co.), O., 185c; Joliet, Ill., 250c; Lockland, O., 185c; Lockport, N. Y., 210c; Lowell, Ind., Lockport, Ill., 250c; Madison, Ill., 335c; Niagara Falls, N. Tonawanda, N. Y., 210c and Vandalia, Ill., 335c per net ton.

49502. To cancel rates on **industrial sand,** C. L., (See Note 3), from Atlantic, Penn., Falconer, N. Y., Kent, O., and Meadville, Penn., to points in Canada, in Items 480 to 580 incl., as amended, of Erie R. R. Tariff 28K; class rates to apply.

49622. To establish on **crushed stone** and **crushed stone screenings,** in open top cars, C. L., Hillsville, Shaw Jct. and Walford, Penn., to Ravenswood, 180c, and Millwood, W. Va., 190c per net ton.

49709. To establish on **gravel,** refuse, shorts, C. L., min. wt. 60,000 lb., from Danville, Sherbrooke and Warwick, Que., to South Bend, Ind., 28½c.

49728. To establish on **limestone,** ground or pulverized, unburnt, C. L., min. wt. 60,000 lb., from Marble Cliff, O., to Duluth, 515c; Minneapolis and St. Paul, Minn., 495c per net ton.

49730. To cancel all rates in B. & O. R. R. Tariff H3376, on **slag,** C. L., other than crushed or crushed commercial, from Columbus, Hamilton, Jackson, Middletown, *New Boston, *Portsmouth and Zanesville, O., to points in the state of Ohio.

*Rate from New Boston-Portsmouth to Superior, O., to be continued in effect.

49798. To establish on **crushed stone** and **stone screenings,** in bulk, in open top cars, C. L., from Ridgeville, Ind., to Detroit, Mich., 150c per net ton.

49800. To establish on **sand and gravel,** C. L., from Gosport, Ind., to Edwardsport, Ind., 90c per net ton.

49801. To establish on **sand** (except industrial), and gravel, in open top cars, C. L., (See Note 3), from Leeland, Ind., to Bowling Green, Ohio, 115c per net ton.

49802. To establish on **granite,** crushed; **stone, crushed, broken or rip-rap,** and **stone screenings,** in straight or mixed carloads, (See Note 3), from Kewaunee, Manitowoc and Milwaukee, Wis., to Ashtabula, O., 250c; Buffalo, Echota, N. Y., 300c; Erie, Penn., 260c; Rochester, 340c, and Syracuse, N. Y., 380c per net ton.

49829. To establish on (A) **Sand,** naturally bonded moulding, in all kinds of equipment, C. L.; **sand** (except naturally bonded moulding, ground or pulverized sand), in closed equipment, C. L. (B) **Sand,** ground or pulverized, in all kinds of equipment, C. L. (C) **Sand** (except naturally bonded moulding, ground or pulverized sand), in open top equipment, C. L.; (See Note 3), but not for less than 60,000 and 80,000 lb. respectively, from Copley, Ohio, to destinations in West Virginia and Pennsylvania:

To Stations	A	B	C
Avella, Penn.	130	143	120
Export, Penn.	160	176	140
Fairchance, Penn.	180	198	160
Flaggy Meadows, W. Va.	180	198	160
Footedale, Penn.	180	198	160
Gates, Penn.	180	198	160
Hickory, Penn.	140	154	120
McDonald, Penn.	150	165	130
Oliphant Furnace, Penn.	180	198	160
Randall, W. Va.	180	198	160
Republic, Penn.	180	198	160
Rivesville, Jct., W. Va.	170	187	150
Stoneboro, Penn.	150	165	130
Smithfield, Penn.	180	198	160
West Brownsville, Penn.	170	187	150
Beachmont, Penn.	150	165	130
Brave, Penn.	190	209	170
Cokeburg, Penn.	170	187	150
Ellsworth, Penn.	170	187	150
Humphreys, Penn.	170	187	150
Josephtown, Penn.	140	154	120
Landon, Penn.	170	187	150
Marianna, Penn.	170	187	150
Mather, Penn.	180	198	160
Nemacolin, Penn.	180	198	160
Shamrock Works, Penn.	180	198	160
Somers, Penn.	170	187	150
Studa, Penn.	150	165	130
Westland, Penn.	160	176	140
Whitney, Penn.	170	187	150

Southern

13705. Paving or road surfacing material, composed of **gravel, crushed stone, slag,** and/or **sand** coated with not to exceed 9% of bitumen including 1% of lime, C. L., (See Note 2) but not less than 60,000 lb. Establish rates from Birmingham, Ala., to destinations in Southwestern territory based on I. C. C. 23094 joint line scale on asphaltic limestone from Margerum, Ala., to Southwestern points.

13713. **Peat sand,** C. L., in open-top cars (See Note 2). Establish from Cowden, S. C., to: Augusta, Ga., 55c; Anderson, S. C., 110c; Columbia, S. C., 115c; Charleston, S. C., Savannah, Ga., Greenville, S. C., Macon, Ga., and Athens, Ga., 120c; Spartanburg, S. C., 130c; and Atlanta, Ga., 135c cwt.

13750. **Sand,** C. L., min. 100,000 lb., (See Note 3). Establish 150c net ton from Talbird Siding, N. C., to Roanoke, Va.

13783. **Mica schist, dry-ground, or screened,** C. L. Min. 60,000 lb. Establish 468c per net ton from Clarksville and Tiger, Ga., to Cincinnati, O.

13808. **Barytes (not ground), not further processed than washed, jigged, tabled, crushed or decrepitated,** C. L., (See Note 2), but not less than 80,000 lb. Establish from Jamestown, Tenn., to Washington, Penn., 570c, and to Lancaster, N. Y., 620c per gross ton.

13813. **Feldspar,** C. L. Establish the following rates to Niagara Falls, Ont.; From Erwin, Tenn., 600c; Minpro, Spruce Pine and Toecane, N. C., 612c; Bowditch and Cane Branch, N. C., 636c per net ton.

13830. **Limestone, crushed, ground or pulverized,** C. L., minimum 88,000 lb. Establish 203c net ton from Harrodsburg, Ky., to Corydon, Ind.

Western

D-43-28 (Sup. 2). **Stone,** from Cold Springs, Rockville, St. Cloud, Sauk Rapids, Sacred Heart, Ortonville, Minn., and Milbank, S. D., to Lindsborg and McPherson, Kan. (See Rock Products September, 1936, p. 63, October, 1936, p. 75). Canceled from the docket.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Southwestern

10024. To establish rates on **slag**, basic, ground open hearth, in packages, carloads, minimum weight 40,000 lb., from Ensley, Ala., to S. W. F. B. territory on basis of 92½% of 1st class.

10351. To establish a reduction of 16c per ton in rates on **sand** from all Oklahoma points to Springtown, Okla., and establish a rate of 64c per ton on **sand** from Denison, Tex., to Stringtown, Okla., which represents 16c reduction same as made from Oklahoma points.

10392. Establish Class 16 rating, minimum weight 50,000 lb., on **clam** or **mussel shells**, not crushed or ground, in packages or in bulk, C. L., between Central and Southern territory, on the one hand, and Kansas-Missouri and Southwestern territory, on the other hand.

10416. To establish rate of 410c per ton of 2,000 lb. on **chatt sand**, carload minimum weight 80% of marked capacity of car, from Webb City, Carterville, Mo., to Farmers, Ky.

10484. To establish on **crushed stone** as described in Item 40, S. W. L. Tariff 162-K, carloads, from Stringtown, Okla., to Tyler, Tex., a rate of $1.06 per ton of 2,000 lb.

Texas-Louisiana

1814-TX. **Fluorspar** from Fredericksburg to Eagle Pass and Laredo, for export to Mexico. To amend Item 1442A, Supplement 89, Texas Lines' Tariff 2-M to include fluorspar in addition to feldspar, rate of $3 per net ton to apply on straight or mixed carloads. Interested shipper states that if the proposed rate is established, they will be in position to purchase their requirements of fluorspar in the United States. Fluorspar is used in Mexico for same purpose as feldspar, i. e., in the manufacture of pottery.

1816-TX. **Crushed stone** from points in Texas to Bergs, Camp Stanley, San Antonio and Randolph Field. To amend rates in Items Nos. 550, 700, 1070 and 1270 of Texas Lines' Tariff 84 to provide for their application as an exception to Railroad Commission of Texas General Rule 8.

1819-TX. **Sand** from Hart Spur and Dorothy to Dublin and Stephenville. To establish the following rates: to Stephenville from Hart Spur 80c, from Dorothy, 85c; to Dublin from Hart Spur, 85c, Dorothy 90c. The rates proposed are intended to meet wayside pit competition.

1822-TX. **Stone**, asphalt coated, from Dittlinger and New Braunfels to San Antonio. To amend Items 750 and 1200 of Texas Lines' Tariff 84, to include **asphalt coated stone** under same restrictions governing crushed stone. This commodity is now being produced at the above named points.

1866-TX. To establish the following rates on **sand and gravel**, straight or mixed carloads, minimum as provided in Item 430, Texas Lines' Tariff No. 84: From Glidden, $1.15 per ton; Gemmer and Tanner Spur, $1.15 per ton; Columbus, $1.15 per ton; Talton, $1.15 per ton; Alleyton, $1.10 per ton; Laban, $1.10 per ton; Eagle Lake, $1.05 per ton; Victoria, $1.40 per ton; to expire June 30, 1937.

Illinois

7139-1. **Sand and gravel.** C. L., from Peoria, Ill., to Springfield, Ill. (See Note 1). Proposed—70c net ton.

7497-7. **Agricultural limestone, sand and crushed stone**, C. L., from Alton, Ill.

To (representative)	Sand	Stone	Limestone
Fruit, Ill.	..	...	75
Sorento, Ill.	..	...	73
Chapman, Ill.	98	...	73
Ramsey, Ill.	111	111	86
Cowden, Ill.	111	111	98
Stewardson, Ill.	111	111	111

7959-3-4. **Agricultural screenings or dust** (fertilizer limestone), ground sufficiently fine so as to be suitable for acid soil treatment, C. L., (See Note 3), but not less than 60,000 lb.

To	From Krause, Ill. Prop.	From Valmeyer, Ill. Prop.
C.C.C.& St.L.Ry.Stas.		
Litchfield, Ill.	73	78
Butler, Ill.	73	78
Hillsboro, Ill.	73	78
Pana, Ill.	86	91
Matoon, Ill.	98	103
Paris, Ill.	111	116

To	From Krause, Ill. Prop.	From Valmeyer, Ill. Prop.
Wabash Ry. Stas. [Representative]		
Willeys, Ill.	97	102
Decatur, Ill.	97	102
Sangamon, Ill.	97	102
Bement, Ill.	102	107
Cushman, Ill.	102	107
Sullivan, Ill.	110	115
Effingham, Ill.	115	120
Prairie Switch, Ill.	102	107
Mansfield, Ill.	110	115

Transcontinental

19123. **Clam shells**, C. L. To establish rate not exceeding 90c per 100 lb., minimum weight 50,000 lb., from Pacific coast to Group E and west, Tariff 3.

19129 (Supplement 1). **Insulating material**, to establish C. L. rate 90c per 100 lb., minimum weight 60,000 lb., from Group D and west to Pacific Coast in new section of Item 1620. Tariffs 1 and 4; sand or refuse, in bags (see Item 1625); mineral wool (rock or slag wool), in solid flat block or solid flat sheets, or in forms or other shapes, loose, or in packages; plain or saturated.

I. C. C. Reports

27432. St. Helens Pulp & Paper Co. vs. S. P. & S. et al. By division 2. Reparation of $377.83 with interest awarded on finding rate, **crushed lime rock**, Seattle, Wash., to St. Helens, Ore., unreasonable but not otherwise unlawful to extent it exceeded 9.5c. The shipments moved between April 17 and May 23, 1935.

Ex Parte No. 104, practices of carriers affecting operating revenue or expenses, part II, terminal services, Louisville Cement Co. terminal allowance. By the Commission on further hearing. Finding in prior report, 210 I. C. C. 293, that the carrier's compensation under its line-haul rates did not cover service performed beyond the interchange tracks described of record and that payment of an allowance therefor was unlawful, affirmed.

27454. L. G. Everist, Inc., vs. C. & N. W. et al. By division 2. Rate, **sand and gravel**, Hawarden, Ia., to Parker, S. D., applied on shipments between July 6 and September 4, 1934, unreasonable to the extent it exceeded 70c a net ton. Reparation of $32.46 awarded, with interest. New rate to be established not later than May 6.

21492. Dewey Portland Cement Co. vs. A. & E. et al., embracing also No. 21500, Dewey Portland Cement vs. A. & W. et al.; No. 21635, Dewey Portland Cement Co. vs. C. B. & Q. et al., and other proceedings listed in the margin of the first page of the prior report. By division 3. In prior report, the Commission found, amongst other things, that the intrastate rates on **cement** from Marquette, Mo., to Sikeston, Mo., and other destinations in the extreme southeastern corner of Missouri would result in undue preference and advantage of manufacturers of cement at Marquette and of intrastate traffic therefrom, and in undue prejudice and disadvantage to complainant and to its interstate traffic from Linwood, Ia., to the extent that the intrastate rates would be lower than the interstate rates to the same points. Undue prejudice was ordered removed by establishment of rates from both points to these destinations based on scale III, as prescribed in Western Cement Rates, 69 I. C. C. 644, 658, 659. Prior findings in order now modified to permit defendant, Missouri Pacific, having circuitous route from Marquette to Sikeston, to meet rate over direct route and to maintain rates no higher at intermediate points in conformity with provisions of state law. The Missouri Pacific asked permission to hold a 9c rate as a maximum at intermediate points.

Industrial Sand Rates

In a report by division 2 in No. 27268, A. P. Smith Manufacturing Co. vs. D. L. & W. et al., and cases grouped therewith, the Commission has awarded reparation on finding rates on industrial **sand**, between certain points in official territory prior to July 1, 1935, unreasonable in certain instances. It has further found unreasonable interstate rates on sand in open top cars from Michigan City, Ind., to certain destinations in Illinois and Missouri, and from Polk and Utica, Penn., to certain destinations in Pennsylvania and New York and has prescribed reasonable rates for the future, to be made effective on or before May 6, 1937.

Defendants in No. 27348 are required to establish on or before May 6 rates on **sand**, in open-top cars, from Michigan City, Ind., to Streator, Pontiac, Gibson City, Decatur, Springfield, Taylorville, Jacksonville, Litchfield, Edwardsville, East St. Louis, Quincy, Belleville and Cairo, Ill., and St. Louis and Hannibal, Mo., which do not exceed those set forth in column B of Appendix II of the report.

Defendants in No. 27398 are required to establish rates for interstate single-line transportation of **sand**, in open-top cars, from Polk and Utica, Penn., to destinations in Pennsylvania and New York for distances of 200 miles and less, rates which do not exceed those made under the West Penn scale, (Penn. Sand & Gravel Prod. Assn. vs. B. & O., 104 I. C. C. 717), based on the single-line distances. Reparation aggregating $5664, with interest, was awarded.

The rates in cents in column B of appendix II referred to are: To Streator, Pontiac, and Gibson City, 113; to Decatur and Springfield, 139; to Taylorville, Jacksonville, Litchfield, and Edwardsville, 151; to East St. Louis, 164; to Quincy, 177; to St. Louis, 189; to Hannibal and Belleville, 214; and Cairo, 239.

Freight Rate Hearing

THE TEXAS RAILROAD COMMISSION will hear a proposal for a reduction of gravel rates on March 10. Application for a rate reduction from 90c to 66c on gravel shipped from the region between Fayette and Houston has been requested to open the way for strong competition between dealers in gravel and shell.

Request Adjusted Freight Rates

NEBRASKA RAILROADS have requested the railway commission for a 5c reduction in freight rates for sand, gravel and crushed stone to be effective along the Platte river from Fremont to Plattsmouth. The reduction is desired in order to meet motor truck competition.

Freight Rate Change?

THE UNION PACIFIC RAILROAD recently applied to the Nebraska railway commission for the re-establishment of an emergency rate on sand and gravel from Columbus to Madison, Humphrey, Tarnov and Peck in anticipation of a movement of road material in the Spring.

LIME PRODUCERS' FORUM

Conducted by
Victor J. Azbe,
Consulting Engineer,
St. Louis, Mo.

RELATION BETWEEN TIME REQUIRED FOR COMPLETE CALCINATION TEMPERATURE AND SIZE OF STONE

RECENTLY a contention was made that limestone calcines faster at low than at higher temperatures. The one so contending must not have been familiar with the very valuable work of C. E. Furnas, of the U. S. Bureau of Mines. In view of this, two fundamentally important charts from Furnas's work are here presented.

In the first, it will be noted that stone of half the size calcines in half the time, if in equal temperature zone. Also, that rapidity of calcination increases much faster than the temperature rise, and that, from capacity standpoint, both a smaller size of stone and a higher temperature are very important.

The second chart presents the rate of travel of the oxide-carbonate boundary line—in other words, the rate of penetration of the zone of calcination. It will be noted that the penetration doubles for a rise of only 100 deg. C., or the equivalent 180 deg. F. It is interesting to find that it requires as much time to calcine the last inch in the core as the first inch on the surface.

Rate of heat transfer depends in great part upon temperature, rising with the rise of temperature. With limestone it should be even more so, as dissociation begins somewhere around 1500 deg. F., the exact point depending upon the CO_2 concentration in the kiln, and temperatures below this are only effective in transferring heat of preheating.

Overburning

In all this there is one modifying factor. If the outside of the lump is overburned before the inside is calcined, the inside will require a higher temperature for calcination on account of the higher CO_2 tension, due to inability of the gas to escape through the sintered outside film.

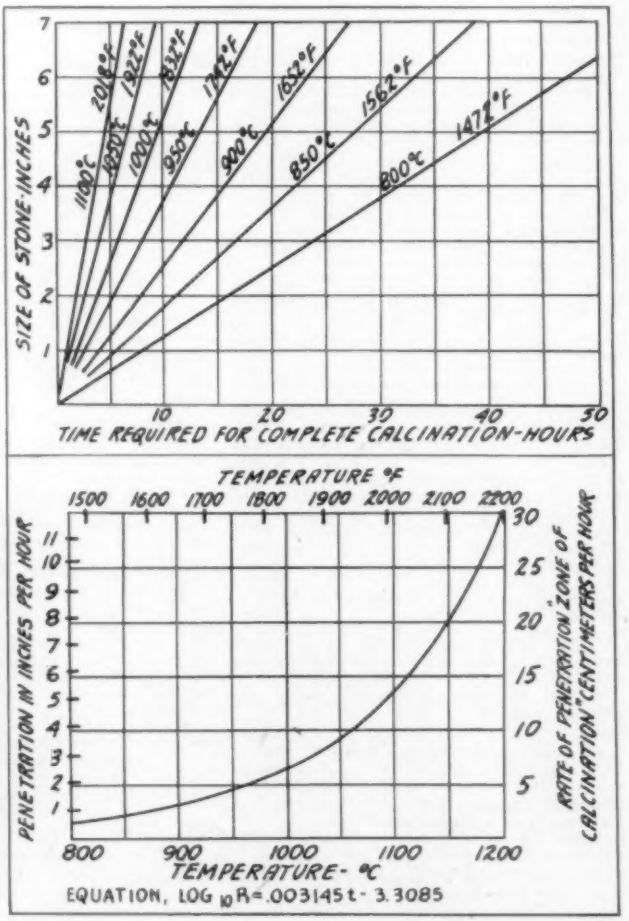
This all emphasizes the desirability not only of small stone, but uniformly sized stone. The attached photograph shows stone in the storage zone of a certain kiln. The large are man-size, taking a very long time to calcine; the small are mere spalls, subject to very rapid conversion, but no faster removal than the large. As it can be plainly noted, the small blocks fill spaces between the large stones, obstructing the draft. Lime drawn from such kilns is a compromise; some will be overburned and some will be underburned; core may be considerable and capacity low.

A Letter from South Africa

What is a large lime plant, and again, what is a large kiln? This depends, of course, on the standard of comparison, and the plant referred to in the following letter recently received from A. E. Spiers seems to establish a new standard for vertical kilns. Mr. Spiers will visit the United States, when we will learn more about this interesting plant, and it is hoped that the Americans will put themselves out to make his visit memorable:

Dear Sir:

For many years I have been reading your interesting articles in ROCK PROD-



RIGHT—Two charts from Furnas's work

BELOW—Small stones among large rock in storage zone of lime kiln obstruct the draft

ucts, on the production of lime, and presume that you are the leading authority on this subject in the United States. I am, therefore, taking the liberty of addressing you with a view to obtaining letters of introduction to visit some of the large lime works in North America.

I am also interested in the lime business, having been works manager of this company for the past fourteen years, and as I will be spending nearly a month in America, I was wondering if you would be so good as to arrange for me to look over some of the large lime plants in the vicinity of New York. I will be in New York from the 28th June until the 10th July. The following are a few particulars of our plant which may be of interest to you.

The plant consists of 16 large type kilns, diameter of shell 20 ft., height from floor to top o fstack 88 ft., and eight small kilns, dia. of shell 15 ft., height from floor to top of stack 55 ft.

The kilns are of the contact type, fired with nut coal and capable of producing 216,000 tons of burned lime per annum. The yield from these kilns is 4.3 tons of burned lime per ton of coal We have three hydrators capable of producing 60,000 tons of hydrated air separated lime per annum.

From what I have read in Rock Products it appears to me that ours is one of the largest individual plants in the world. According to Rock Products of October, 1935, page 39, 324 lime plants in America produced 2,379,115 tons of lime in 1934. We produced 144,711 tons of burned lime in 1936, that is to say that our plant produced in one year just over 1/16 of the total output of lime in North America for the year 1934.

You will notice on the letterhead that there are only twelve large kilns, but we have erected four more large kilns since the letterheads were printed. I am leaving South Africa on April 2nd, proceeding to America via Australia, and I would be pleased if I could have a reply from you before I leave. Hoping to have the pleasure of making your acquaintance while I am in the United States, I am

Yours Truly,
A. E. SPIERS.

The Northern Lime Co., Ltd.
P. O. Norlim, via Taungs, C.P.
South Africa.

New Limestone Plant

A new stone crushing plant is to be built in the Pittsburgh district soon, according to recent reports. E. Frank Wilson will be production manager of the new concern and will assume charge of erecting the new plant.

Annual Safety Banquet

Ste. Genevieve Lime and Quarry Co., Ste. Genevieve, Mo., held its 5th annual safety banquet recently and presented a safety award to the "shed" safety team, winner of the plant safety contest for a no-accident record. C. H. Kammann, president, and K. P. Kammann, vice-president, addressed the men and interpreted various pertinent legislative measures.

Lime Wage Increase

American Lime and Stone Co., Bellefonte, Penn., recently announced a 10% wage increase for all employes.

To Triple Output

Belle Isle Lime Co., Detroit, Mich., is reported to be speeding plans to triple its production capacity during 1937 and is said to have purchased an additional kiln. The plant first went into production in October, 1936.

County Lime Plants

Under a drought relief project, nine lime kilns are in various stages of construction near Pearisburg, Va. Each unit will have a daily capacity of 60 tons of lime. It is claimed that lime from these kilns will be sold to farmers at reduced prices. Labor, explosives and tools are furnished by the government. When construction is completed, 12 kilns will be placed into production.

Production Stopped

Ash Grove Lime and Portland Cement Co., Kansas City, Mo., temporarily suspended production in January when all storage was filled. Resumption of production will depend upon weather conditions and cement shipments.

Blasting Enjoined

Hansen Lime and Stone Co., Salt Lake City, Utah, has been restrained by the city commission from blasting in its quarry. Numerous complaints had been received.

Sell Stone Company

National Lime and Stone Co., Findlay, Ohio, was recently sold to an unknown buyer. Included in the sale was a 53½ acre plot of ground near Bluffton, Ohio, which is expected to be developed.

Stone for Filter Plant

Quartzite Stone Co., Lincoln, Kan., has been delayed by weather in quarrying and crushing 240 carloads of rock needed for a filter plant project in Hutchinson, Kan. The company has equipped its compressed-air system with an anti-freeze attachment to prevent moisture from condensing in the lines and freezing.

To Open Two Quarries

E. C. Schroeder, McGregor, Iowa, has been awarded a $125,000 contract to furnish stone for dam No 13 on the Mississippi river at Clinton, Iowa. A quarry will be opened at Clinton and also at Fulton, Ill., to furnish the stone.

Good Order

Tobin Quarries, Inc., Kansas City, Mo., has received contracts totaling $49,373 for the construction of esplanade works on four government dams.

Attempt to Steal Locomotive

Toledo Stone and Glass Sand Co., Silica, Ohio, recently reported that two men had fired the boiler and attempted to steal a quarry locomotive. Several gauges were smashed in the attempt.

Wins Rail Case

Baillie Stone Co., Sandusky, Ohio, was the winner in a verdict handed down in which the New York Central Railroad Co. was denied the right to move three miles of track extending from the main line to the company's quarry in Berlin township.

Increases Capacity

Harry Nolle, St. Charles, Mo., has purchased a 100-hp. McCormick-Deering unit. Capacity of his quarry will be increased to 240 tons of crushed rock in a 10-hour day.

Good Salesmanship

Manchester Lime Co., Manchester, Tenn., held a demonstration on mixing fertilizers at its warehouse February 6 under the auspices of the Coffee County Conservation association.

To Add New Quarry

Columbia Quarry Co., St. Louis, Mo., which has plants at Columbia, Ill. and Valmeyer, Ill., is reported to have closed a deal for a new quarry at Prairie du Rocher. Rock will be trucked from the quarry at first until a spur from the Missouri Pacific railroad tracks can be built.

Expanding

Pennington Trap Rock Co., Pennington, N. J., will resume operation late in March, after considerable equipment is installed. New machinery includes two 450-hp. Diesel engines, three gyratory crushers, four new screens, two 54x14 secondary crushers, a 60x42 primary crusher, a 2-yd. steam shovel and a mixing belt.

To Seek New Level

Contractors for Coulee Dam will have removed the top 100 ft. from the 70-acre Brett gravel pit above Mason City, Wash. within a few months and will then lower equipment to start removal of another 100-ft. slice. Enough sand and gravel for about 450,000 cu. yd. of concrete remains to be removed from the present level.

Engineers Discuss Matters of Interest To Rock Products Producers

Mineral Industries Division of American Institute of Mining and Metallurgical Engineers Provides Opportunity for Questioning Experts

THE AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS now has an Industrial Minerals Division designed to attract membership in the Institute of qualified engineers engaged in the production of such rock products as crushed stone, sand and gravel, lime, cement, gypsum, silica and the less common non-metallic products. The editor of ROCK PRODUCTS, long a member of the Institute, was instrumental in establishing this division—formerly the Industrial Minerals Committee—as a means of providing engineers in the rock products industries with an opportunity to exchange experiences with engineers in other branches of the mining industry whose special knowledge is often more extensive and therefore should be valuable in the solution of many rock products operating problems.

The Industrial Minerals Division is not in any way designed to compete with the national associations in the rock products industries, but to supplement them by providing an extension of the technical education of the professional engineers in the rock products industries, of whom there are many. Programs are designed to provide papers by technical experts in the mining industry describing the latest advances in processing minerals, such as crushing, grinding, classification, flotation, etc., which have numerous applications in the rock products industries, and papers by rock products operators that provide mining engineers with some knowledge of this field, which in general they lack.

Up to this time papers of the latter description have been rather scarce, and have been contributed more by engineers of the U. S. Bureau of Mines and of the various state geological surveys than by operating men in the rock products industry; but operating men in the rock products industry have been missing some splendid opportunities to learn more about the fine points of mineral processing by failing to become members of the Institute. The most helpful and valuable part of these meetings is the informal discussion where questions are freely asked and much expert advice gained by those seeking answers to troublesome operating problems.

Operating Man Chairman

At the annual meeting of the Institute in New York City, February 15-19, CHESTER A. FULTON, president of the Southern Phosphate Co., Baltimore, Md., was elected chairman of the Industrial Minerals Division, the first operating man to fill the office, and it is anticipated that future meetings will be made even more interesting to other operating men. J. R. THOENEN, U. S. Bureau of Mines, Washington, D. C., was reëlected secretary-treasurer of the Division.

Open-Pit Mining Power Scrapers

HARRY A. ROE, chief engineer, Sauerman Bros., Inc., Chicago, Ill., described "The Functions of Power Scrapers and Slackline Cableway Excavators" in a paper which was pre-printed and may be obtained from the American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York City (Technical Publication No. 799). In it he gave considerable data not hitherto published in regard to power requirements and capacities, as well as providing a manual of applications. As drag scrapers and slackline cable excavators are among the commonest devices used to excavate and convey sand and gravel, this paper should be very helpful.

For example, discussing operating problems, Mr. Roe said: "During the past 17 years I have seen power scrapers handling a good many different kinds of materials, and have found that a reasonable proportion of these power scrapers were not doing their jobs satisfactorily. Why? In the majority of instances the user, the buyer, or the seller had disregarded the most simple axiom in drag-scraper practice; that is, when the material does not come to the bucket, the bucket must go to the material! In other words, the average drag-scraper installation is sold by the manufacturer on the assumption — often erroneous — that the scraper is going to handle reasonably free-caving material. Provision made in the average installation for controlling and shifting the digging point of the bucket is entirely adequate for caving materials; it is all too frequently inadequate for non-caving, hard, or sloppy materials.

"Adequate provision for easy, frequent, and rapid shifting of the line of operation of the bucket, and for the control of the loading point is readily available. In slackline, gravity-return machines such provision is most adequately provided by the use of self-propelled tail towers. On intermediate and long-span, drag-scraper operations movement of the tail block does not always suffice.

"A drag scraper does not operate on straight radial or parallel lines, but follows the path of least resistance. The loaded scraper slides sidewise and it travels in the bottom of the cut. The empty scraper runs back in the old cut, and will leave ridges and a rough and unsightly pit unless skillfully operated. Failure to recognize this tendency and to apply its corrective is the major source of operating problems. A third operating cable with a flying block (loading block), riding the back-haul cable opposite the digging point, will control the bucket, clean up the ridges, and leave a clean pit or stripping job. Control of the flying block by a hand winch has proved quite satisfactory for small installations. Control from the scraper hoist by the operator is faster and more economical for large installations.

"In extremely coarse material, such as blasted rock, and in very hard digging, such as soft shales, there is an added necessity for the ability of the scraper operator to place the bucket at the most advantageous point for loading. It is not only undesirable to dig at the bottom of the cut; it is very much more difficult to do so. Therefore, the feature necessary to practical success most frequently overlooked in power-scraper practice is adequate provision for definite control of the loading point of the scraper."

Trucks and Conveyor Belts

S. A. TRENCOVE, University of Wisconsin, contributed a paper on "Open-pit Mining by Trucks and Conveyor Belts"—a method recently developed in the Minnesota iron mining field. It has already been used to some extent in the rock products industry and consists

merely of using motor trucks for short hauls from the face to a hopper feeding long belt conveyors which elevate and convey the material from the pit to plant.

Efficiency of Pulverizers

RAYMOND WILSON, former conservation engineer, Portland Cement Association, Chicago, Ill., now with the engineering department of the Lehigh Portland Cement Co., Allentown, Penn., contributed a paper on "A Method for Estimating the Efficiency of Pulverizers," which can be obtained in full from the Institute (Technical Publication No. 810). In it he gives some of the results of the P.C.A.'s study, of clinker grinding, including the description of an impact grindability test which was developed by the author in the P.C.A. laboratories, consisting essentially of an anvil, a plunger, and a guide tube. A sample of clinker is placed on the flat anvil and crushed or pulverized by the plunger, the power or energy for which is supplied by the impact of a 24-in. fall of a 2½-in. steel ball. The mechanical energy of the falling ball is readily calculated. The surface areas of the clinker before and after tests are similarly calculated—in this case by the use of the Wagner turbidimeter. Hence it is possible to find the relation between surface produced and the application of a known amount of power.

"In conventional mills," said Mr. Wilson," the production of surface is less efficient than in the impact test. The basic cause of this inefficiency is doubtless the inability of the grinding surfaces to apply their energy effectively to the particles. Several factors may contribute to this ineffectiveness. The grindability test gives a basis for estimating the degree of effectiveness in the application of energy to the particles being pulverized, by providing means for computing the ideal rate of surface production for a given power input to the mill. The units used in reporting grindability are such that the ratio of the surface-barrels per kilowatt-hour produced in the mill to the grindability value for the clinker is the efficiency of the mill."

This method of testing efficiency, perfected and correlated by use of a 29-in. x 40-in. laboratory mill, when applied to commercial mills showed that "at outputs yielding a product coarser than 1400 specific surface, most of the mills tested operated at an efficiency between 25 and 40%. These values are much higher than have been estimated on theoretical grounds by various investigators. . . . . In view of some of the impressions of extreme inefficiency of pulverizers, the indications of these tests are rather reassuring.

"Dead load losses, in the motor, the drive and the mill bearings will account for at least 20% of the total loss. A smaller amount is used in the movement of clinker within the mill, a power use that yields little return because the impacts resulting from it are too light to shatter the particles. The major source of power loss is probably in the form of ineffective contact between the grinding surfaces and the material being pulverized. In very fine grinding in tube mills, the balls near the discharge end become coated with reconsolidated fine material, the effectiveness of contact is decreased and mill efficiency becomes lower than in coarse grinding. Proper closed-circuit operation can overcome much or all of this difficulty. The method of analysis used in these tests suggests a means of judging the efficacy of closed-circuit operation by comparing efficiencies at high and low output rates."

The accompanying table gives results of some sample tests:

MILL EFFICIENCY TEST DATA

Type of Mill	Power, Kw.	Output Bbl. per Hr.	Kw.-hr. per Bbl.	Specific Surface, In.		Surface, Bbl. per Kw.-hr.	Grindability of Clinker	Efficiency of Mill, Per Cent
				Feed	Product			
Compartment ...	320	55	5.8	[a]	1430	246	970	25
Compartment ...	320	42	7.6	[a]	1700	223	970	23
Compartment ...	320	34	9.4	[a]	1780	189	970	19
Compartment ...	320	29	11.0	[a]	1760	160	760	21
Compartment ...	330	82	4.0	[a]	1410	351	1060	33
Tube	370	82	4.5	1410	2040	140	1060	13
Compartment ...	430	104	4.1	[a]	1540	372	860	43
Ring-roll	265	165	1.6	[a]	540	336	1050	32
Tube	310	90	3.4	540	1610	315	1050	30

[a] Negligible specific surface.

As a result of his studies Mr. Wilson concluded that much of the pulverizing action that takes place in conventional mills consists of shattering the coarser particles by impact. A blow too light to shatter a particle completely, or a glancing blow, may cause local shattering at the point of contract, or a clipping of edges and corners. A small amount of grinding may occur by a process of attrition or abrasion as the particles are rubbed by the grinding surface.

Grinding with Hammer Mills

A paper contributed by F. CADENA, formerly with the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., on "Grinding with a Hammer Mill at the Norris Dam," was read only as a brief abstract. It was not preprinted. It was said to contain much valuable data on costs and efficiencies in reducing 5-in. dolomite to minus ⅜-in. material for use as a fine aggregate. A hammer mill was adopted to do this work because previous experience had shown it would produce fewer slivery particles, and the near cubical shape of particles was important. The mill was used in closed circuit with a 75 to 100% circulating load. Of two types of mills tried the "stirrup" type was found more efficient than the "slugger" type. It was necessary to shut down every 44 hours to replace hammers, and it was necessary to stop in between to reverse the hammers.

Ball Mill Grinding

WM. H. COGHILL and FRED D. DEVANEY, U. S. Bureau of Mines Experiment Station, Rolla, Mo., contributed a brief but potent paper on "Ball-Mill Grinding," that consisted only of conclusions, without the supporting data, which will probably be published at some later date. A few of these conclusions were: "Some of the characteristics of dry-batch ball milling were unlike those of wet grinding. In the dry work efficiency as well as capacity were best with the light ore charge. Power decreased with decrease of the amount of ore in the mill; in wet grinding it increased with a decrease in the amount of ore in the mill. In dry grinding high speed was more efficient than low speed. . . . . In comparing wet and dry, open-circuit, ball milling, wet grinding gave 39% more capacity and 26% more efficiency. . . . . The efficiency of battered, reject balls was about 11% less than new spherical balls. . . . . In closed-circuit grinding the mean particle size of the useful composite feed becomes smaller as the circulating load increases. . . . . A constant ratio exists

between the amount finished and the arithmetical mean of the surface of the composite feed and circulating load. In any given ball-mill operation (batch or continuous) throughout a variety of circulating loads, the amount finished through a selected screen varies directly as the arithmetical mean of the amount of total surface in the unfinished feed and discharge when the amount of composite feed is taken as unity. When finished material is returned in the circulating load, the percentage decrease in mill capacity is identical with the percentage of finished material in the composite feed. With increase of finished material in the feed, the output becomes finer so that the ultimate grinding is not materially reduced.

As to types of mills and grinding media, the authors concluded: "Tests of a variety of concentric drums in a cylindrical mill failed to justify the drum. . . . . Tests for the optimum size of balls brought out the point that the balls which were too large did non-selective grinding as well as balls that were too small."

Short Column Hydraulic Elutriator

For measuring subsieve sizes of particles S. R. B. Cooke, U. S. Bureau of Mines Experiment Station, New Brunswick, N. J., described an elutriator with a column cut down to only 3½ in., which gave fairly accurate determinations of sizes as small as 2 or 3 microns.

Classification

Charles K. McArthur, manager, Canadian division, Dorr Co., Inc., New York City, contributed a paper on "Modern Trends in Classification," which, although primarily intended for the metal-mining industry, contained much material that would prove helpful to cement manufacturers who employ closed circuit wet grinding of raw materials.

Silicosis

Dan Harrington, chief of the Health and Safety Branch of the U. S. Bureau of Mines, opened the silicosis session Thursday morning with a summary of dust hazards and their control in mining. Mr. Harrington's wide experience in mining and his work relating to silicosis qualify him as one of the foremost authorities in the country on this subject, and his paper was received with great interest.

Mr. Harrington stressed the controversial nature of the dust disease problem and purposely confined his remarks to the fundamentals of and the necessity for dust control. He contrasted rock dusting in coal mining with the efforts to eliminate dust in other mining operations. Although apparently at cross purposes, both procedures have saved hundreds of lives. The elimination of dust in metal mining has not been as widely practiced as rock dusting in coal mining, possibly because the results are less spectacular, but at present there are probably more deaths from silicosis and other dust diseases than from explosions in coal mining.

Silicosis is the most serious but not the only disease resulting from exposure to dust. Similar lung ailments caused by anthracite, asbestos, and other mineral dusts are common. Mr. Harrington stressed the point that all dusts are harmful, both internally and externally. Dust may affect the respiratory passages, stomach, liver, and other organs, as well as the lungs. It may be harmful to eyes, ears, and frequently is the cause of serious skin disorders. In general, silicosis results only after considerable exposure to dusts containing free silica. The quantity to which employes are exposed is therefore of great importance but extremely difficult to measure. Temperature and humidity, as well as exact location in the stope or room may have appreciable effects on the dust count. According to Harrington, it is futile to establish a dust count as the final preventive for silicosis.

There is a definite lack of knowledge on harmful sizes of dust, although from .2 to 10 microns apparently is the probable range, judging from examination of persons with silicosis. Larger sizes, however, may clog the natural filtering devices of the respiratory system thereby allowing free passage of the smaller and more harmful particles.

Control of Dust Only Solution

Mr. Harrington was particularly emphatic on the point that control of dust at the source is the only effective preventive for silicosis. He outlined three fundamentals in dust control — proper ventilation to remove dust, use of water to kill dust at its source, and elimination of blasting during the working shift. In metal mining or nonmetal operations where dust conditions are bad, all drilling should be done wet. Many operators have resisted wet drilling because of the extra expense in piping water to the drills, and the men themselves have objected because use of water results in sloppy working conditions. In addition to drilling, water should be used to wet down the broken ore and in other dusty places. Mr. Harrington cited instances where working conditions would not permit use of water and recommended that proper ventilation would do much to eliminate dust. Blasting on the off-shift or at the end of the working shift prevents the men from being exposed to dust raised by the blast. It is believed also that gases from the explosives may have a supplementary bad effect on the respiratory organs.

In summarizing, Mr. Harrington was strong in his conviction that all dust is a menace, although research is necessary to learn facts about dust. Even so-called harmless dust may have harmful effects. The safest and best procedure is to kill the dust at the source.

Who Gets Silicosis?

Dr. A. J. Lanza followed Mr. Harrington to answer the also controversial question as to who gets silicosis. Dr. Lanza stated that, in general, the effects on individuals depend directly upon the severity of exposure rather than any variation in susceptibility. The Picher clinic examined 37,000 miners and came to the conclusion that silicosis is not influenced by racial or structural traits. It is true that lungs impaired by tuberculosis or other diseases acquire silicosis much more readily, and it was found also that negroes seem to be more susceptible but possibly because tuberculosis is more prevalent among negroes than whites in that area. Dr. Lanza pointed out that it is virtually impossible with the present knowledge of the disease to make positive statements regarding silicosis.

Infection has been the basis of compensation for silicosis, and the unparalleled wave of litigation in the past few years has brought the subject forcibly to the attention of operators and insurance companies. The chronic nature of silicosis has resulted in virtually upsetting the whole system of insurance, and the only solution of the perplexing problem, according to Dr. Lanza, is to recognize disability rather than diagnosis as the basis for claims for compensation.

Dr. Lanza admitted that dust counts were useful if taken intensively to indicate actual average, but he cautioned against rushing into legislation depending upon dust counts. Another complicating factor in legislation is the virtual impossibility to write a dust code to cover all industries. In general, it is desirable to maintain air in working quarters containing not more than 5,000,000 particles of dust per cu. ft., if the silica percentage is high. While awaiting legislation, Dr. Lanza recommended that mining companies establish tentative standards for their own use and was particularly emphatic in urging the elimination of dust, following Mr. Harrington's suggestions. He recommended further that whenever practicable, persons with silicosis should be transferred to non-dusty jobs, while those with

tuberculosis should be immediately hospitalized. Above all, he warned against a stampede to hasty legislation that might further complicate an already controversial problem.

GEORGE S. RICE contributed an interesting account of the early problem of "miners' consumption" which was stressed by the operators in 1910 as one of the most acute problems confronting the mining industry. When the Bureau of Mines was organized in 1910, health and safety in mining comprised its principal work, and although remarkable improvements in both have resulted from the Bureau's work, the silicosis problem remains serious in virtually all branches of mining.

Other Subjects

Other papers included "Limestone Quarrying in Northern Arkansas," by G. C. BANNER, of the Arkansas Geological Survey, which gave helpful data on the locality and kinds of limestone deposits; "Technical Progress in Industrial Minerals," by OLIVER BOWLES, U. S. Bureau of Mines, which summarized developments readers of ROCK PRODUCTS are doubtless familiar with; "Concentration of Spodumene," by FOSTER FRAAS and OLIVER C. RALSTON, U. S. Bureau of Mines Experiment Station, New Brunswick, N. J., which dealt with a comparatively new and rare ceramic material. The principal interest of rock products producers in this material is that roasting in shaft kilns or in rotary kilns is the method used to concentrate the raw mineral, which is a compound or mixture of lithia (LiO_2), alumina (Al_2O_3) and silica (SiO_2). It is known to occur in North Carolina and in South Dakota in commercial quantities. If sufficient demand is created for the concentrated mineral and other accessible deposits are found, its concentration might become something of a sideline for suitably situated lime and cement manufacturers.

The only other papers of interest to ROCK PRODUCTS' readers were "Prospecting for Florida Phosphate," by R. V. ROUNDY and G. R. MANSFIELD, U. S. Geological Survey, which described methods of drilling and sampling pebble phosphate deposits; "Limestone and Lime—Their Industrial Uses," by M. F. GOUDGE, Canadian Geological Survey, Ottawa, Ont., which dealt entirely in generalities; and "Utilization of Slag in the Birmingham District, Alabama," by JAMES R. CUDWORTH, and JOSEPH C. MEAD, Alabama School of Mines, which gave valuable statistics, but little of technical value for slag producers. This paper was preprinted (Technical Publication No. 796) and can be obtained from the Institute.

Flood Orders

THOUSANDS of tons of Birmingham furnace slags are continuing to be shipped to the Ohio and Mississippi valleys for railway roadbed repair in the flooded areas. Several thousand tons have already been shipped for use in strengthening levees.

Universal Atlas Appointments

UNIVERSAL ATLAS CEMENT CO., Chicago, Ill., a United States Steel Corp. subsidiary, announces new appointments, effective March 1, as follows:

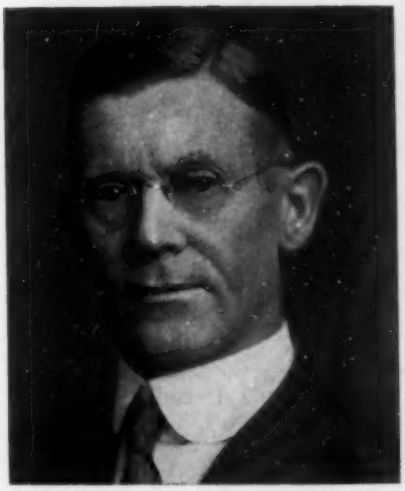
O. N. Lindahl, comptroller and secretary; J. J. Heffernan, assistant secretary; Leonard Wesson, operating manager; S. J. Robison, chief engineer; O. L. Moore, director of tests and research; J. C. Witt, manager of research and development; T. A. Hicks, general chemist; G. L. Lindsay, engineer of tests; R. B. Hynes, purchasing agent; E. D. Barry, manager of industrial relations; Gordon C. Huth, assistant manager, industrial relations.

Two veterans in the cement industry, John Ahnfelt, operating manager, and A. G. Carlson, chief engineer, are retiring under the corporation's retirement plan after 43 years and 34 years, respectively, with the company.

Mr. Ahnfelt began his career by making cement tests at the old North Works of the Carnegie-Illinois Steel Corp., Chicago, where the company first made cement; and he served as assistant superintendent at the newly built plant at South Works. Later, he was assistant superintendent and then superintendent of the Buffington, Ind., plant. In 1919 he became operating manager of all plants. Mr. Ahnfelt is a member of the Western Society of Engineers and the Chicago Engineers' Club. He served on the Portland Cement Association's first committee on accident prevention.

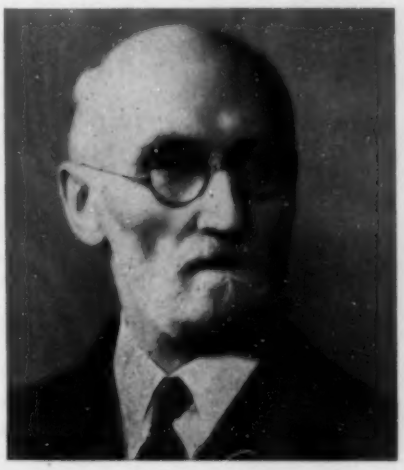
Mr. Carlson started as designer at the Buffington plant and 22 years ago was appointed chief engineer. Before his connection with the company, he was with the Medusa Portland Cement Co. and designed and built its plant at Syracuse, Ind. Mr. Carlson is a member of the American Society of Mechanical Engineers, the Western Society of Engineers and the Chicago Engineers' Club. Since 1915 he has served as a member of the Portland Cement Association's committee on manufacturing research.

All the appointments are promotions of men with long service records with Universal Atlas Cement Co. Mr. Lindahl, the new comptroller and secretary, formerly was auditor and assistant secretary and has been with the company for 30 years. Mr. Heffernan, assistant secretary, has been in the secretary's office for 7 years and with the company for 12 years.



John Ahnfelt

Mr. Wesson, operating manager, was assistant operating manager and has more than 27 years' experience in the cement company. Mr. Robison, chief engineer, was assistant chief engineer and has been with Universal Atlas for 29 years. Mr. Moore, director of tests and research, was engineer of tests and with the company since 1914. Dr. Witt, director of research and development, was chemical engineer and is widely known in that field. Mr. Hicks, general chemist, has been with the cement company more than 30 years. Mr. Lindsay, engineer of tests, was assistant engineer of tests, with 20 years' experience. Mr. Hynes, purchasing agent, formerly was secretary and has been connected with the concern for over 20 years. Mr. Barry, head of the new department of industrial relations, has had 34 years of experience with the organization and his assistant, Mr. Huth, previously was assistant operating manager.



A. G. Carlson

"What's on the Worker's Mind Today?" *

A Talk With Employers Regarding a Healthful Approach to Labor Problems

By Whiting Williams,
Cleveland, Ohio

I THINK I can best start by telling some of the things which I am convinced are *not* on the worker's mind. Everywhere I go these days I find employers inclined entirely too much to assume that what is on the worker's mind are the things reported as there on the worker's mind by a certain group of labor leaders. These leaders are saying that the things on the worker's mind today are very big, fundamental, historic, class issues, that the gulf separating this employe from his employer is so deep, so filled with difficult and mysterious points of difference and that no one except the labor leader can hope to understand them.

The result of that conviction, which I find too commonly in the mind of the employer, is his belief that whether he has labor trouble or not is simply a matter of chance, that if he sticks his head in the sand and keeps quiet enough about labor matters, he will escape the attention of these master minds who might otherwise send out word for the employes to strike in his particular plant.

I am convinced that that is not at all the way the thing happens. We are being told today that John L. Lewis, for instance, sits in his office in Washington and sends out word that there shall be a strike in Jones' plant in Jonesville, and a week later that there shall be a strike in Smith's plant in Smithsville, with, therefore, nothing to be done about it. On the contrary, where labor trouble happens, it is much more largely as the result of what the workers in that particular plant have on their minds as employes of a certain employer than as the result of the strategy of some master mind five or six hundred miles away. When you discover these things on the minds of those workers causing them to make trouble at that particular place on that particular day, you find not an aggregation of large issues, but, on the contrary, an aggregation of unadjusted grievances—grievances which are comparatively small, grievances which could have been taken care of if the employer had realized that this whole matter of labor relations is nothing after all but a matter of understanding, sympathy and statesmanship between one individual called an employer and a group of other individuals called employes.

Not Mystery—

but scientific knowledge of the mainsprings of men forms the basis for Whiting Williams' remarks on capital-labor relations today. Mr. Whiting reduces the knotty points of employer-employe co-operation to simple, rational, understandable components. A nationally known author and consultant on personnel and management problems, he has been associated with Harvard University, Dartmouth University and the University of Pennsylvania as lecturer, and he has studied workers' conditions firsthand in the United States, Great Britain, France, Germany, Russia, Italy, Canada and Central and South America.

Remember, Union Dues Are Voluntary!

I realize that it takes some courage to make that claim, but I am constantly told that a leader, with the help of a very small and perfectly unreasonable minority, can cause trouble anywhere and can get the workers out onto the street. This is true. It is easier than ever before for a leader and a small minority to close down a plant, but that leader cannot build upon that unless he can make that initial disturbance into a success—a success which gains for the workers in that particular plant such advantages as will justify them in continuing to pay month after month voluntarily and gladly the dues which that leader hopes to realize, because that leader cannot possibly live in that particular spot except as life is made possible for him by the voluntary month after month payment of dues.

Today the ordinary employer, the ordinary legislator, particularly down in Washington, and a large part of the public, make this very serious mistake: They take the labor leader a great deal more seriously than he deserves to be taken, while they take the ordinary employe who after all is the boss of the leader, much less seriously than he deserves to be taken. When I get into a situation as the result of the consulting work I have been doing, especially during these last three or four years, I find that while it is true that a leader and a small minority can start trouble more easily than ever before the coming of NRA, nevertheless a disturbance thus started by a small minority remains a disturbance without a victory unless that small minority obtains either the active or the passive help of a much larger group, of something like a majority, a group outside the 10, 15 or 20 percent pro-union, and outside the 10, 15 or 20 percent pro-company, a 60 percent group, called properly the pro-job group, are workers who want to do their job during the day with a maximum of satisfaction and then go home at night.

Do You Understand the Minds of Your Employes?

That indispensable help of this indispensable near-majority, I find in my experience is impossible for the minority unless its members hold on their hearts and minds an aggregation of unadjusted grievances. Of course it is perfectly plain that those unadjusted grievances on the hearts of that much larger group are impossible except as management has failed to understand the minds of their workers.

I submit that this makes the whole situation much more hopeful than if the country were to be subjected to telegrams calling a strike here and a strike there without rhyme or reason. This brings it down to the point where you can say: If the workers' majority is unhappy, they won't wait until they get word from John Lewis' headquarters to call a strike; they will stage a sit-down the moment they become convinced that under outside leadership they can get those unadjusted grievances taken care of.

Let me tell you my experience in support of this observation. I was called down about three years ago to a place where 1,000 men had been on strike for five weeks. I am told by the manager that, after years of very good relationship with the workers, an agitator had come all of a sudden and caused the trouble. He introduces me to the committee of five employe-leaders. A week later I have to go back to the manager and say, "I have been getting these fellows to tell me the story and they say all that happened was that three days before the strike occurred, 45 tire

* Presented before the Twentieth Annual Convention of the National Crushed Stone Association held in Cincinnati, Ohio, January 18-20, 1937.

builders out of your 4,000 men sent this same committee to the management to find out whether it was true that a certain 3c an hour increase had been made in another nearby factory, in a district where if one factory increases the wage, it becomes automatic throughout the district; that they looked for you, Mr. Manager, but not finding you went to your substitute. This substitute manager assured them they would have his answer in 24 hours, but three days later they had been unable to get any answer from him.

"The beginning of the fourth day the first shift of 15 men sat down in opposition to the pleadings of the committee. When the second shift sat down without any results and the committee failed to find some representative of management who could give them an answer on this 3c an hour affecting 45 of your 4,000 employes, the third shift walked out as the others were coming in and the strike was on!"

Now you don't have to have NRA, you don't have to have a President urging people to join a union, you don't have to have a master mind sitting in some central office to explain that disturbance. It was nothing but a case of that well known disease called 'managerial stall-itis'—a case of stalling by the management.

More Personal Experiences

I have in mind another case where they asked me to find out what was on the minds of a group of workers where relations had been very friendly for years in a small town where everything, management thought, had been perfectly well taken care of, and yet where all of a sudden the employes had joined a union and called a strike. It was no job at all to find out. All you had to do was loaf around a few restaurants and pool rooms and hear the same story:—"Well, you see, during the depression the management in order to save money fired the superintendent." They had never had any employment manager, so that meant that every single foreman in every single department wanted to be a complete czar and unless you were willing to bring him a bottle of whiskey every so often, you stood a chance of losing your job in spite of the fact that you might have been there twenty years. "What could we do," they said, "except to ask for help from the outside? So we got a leader in and he has been protecting us ever since." Nothing but a case of 'foremanitis.'

* * * * * * * * * * * * * *

Individual Grievances Not Class War

To make my point that the cause of labor trouble remains, in spite of everything many say to the contrary, largely a matter of individual workers, not of a working class, and represents individual grievances of comparative non-importance if taken care of, I can't do better than to tell you of a man who confirmed my diagnosis.

"Three or four weeks ago," he related, "I was called by an assistant manager outside of Cleveland to come down and see what I could do to end a strike of 500 employes who had been out for four weeks, who according to the manager were getting into a worse mood and nastier temper all the time.

"I never saw such a nasty tempered committee as the five employes who sat down in front of me and shoved across the table a sheaf of papers. 'There, Mr. Vice-President,' they said, 'are 42 demands, and until every one of those 42 demands is met not one person gets through our picket line alive!'

"In school I had read that, of course, there are these big, fundamental differences which differentiate the employer from the employe and make it very difficult for him to understand the mind of the worker, so I kept puzzling to myself how we could have possibly kept on the job for ten years a manager who could have allowed such big, fundamental issues to develop to the number of 42. But I looked at No. 1. 'Demand No. 1 has to do with the case of John Slovinsky who, after ninteen and a half years of service, was displaced on such and such a day, unjustly, his job being given to Bill Brown with only one year and three months' service. Demand No. 1 is for a rehearing of the case of John Slovinsky.'

"I turned to the manager and said, 'If that really comes within a mile of stating the case, I think we ought to give John Slovinsky a rehearing. What do you think?' And after half an hour we decided to grant demand No. 1.

"Demand No. 2 was the same thing: Mary Smith, under such and such condition, had been unjustly treated by her foreman. Believe it or not, 38 of the 42 demands had to do with no issue more fundamental, more historic, more class-wide than the case of John and Mary and Bill and Jim and Joe. After three or four hours' conversation we got them all fixed up in a manner satisfactory to both sides.

By that time, I was looking ahead to see what these other four were about. They were the biggest issues you ever saw! We could have the Board of Directors in New York talk about them for six months and the Constitution of the United States might have had to be changed before we could fix them up. So I thought, so far so good, but here's where the fun begins—especially when the chairman got to his feet. But what do you think he said? He said, 'Well, with those 38 demands taken care of, Mr. Vice-President, we say, to hell with the other four! We'll be back to work in the morning!"

Some European Experiences

I recall, for instance, being one day in a mine over in the Rhondda Valley of Wales where a sit-down strike was going on long before we ever heard of such things in this country. I was standing there outside the pit ready to go down in the hoist along with 500 men, because even though the sit-down was going on, we all went to our places down at the face of the seam at our regular hour and came out at the regular time. The only difference was that nobody did a stroke of work, realizing that if anybody touched hand to tool below, he would be beaten up by the committee in charge. So we spent our hours singing—singing, as only good husky Welshmen can sing, about the blood-red flag of revolution and of the day "when we'll have the pleasure of a-pinnin' that blood-red flag of revolution to the very 'ighest pinnacle of the 'Ouse of Parlymint."

The strike was being conducted by some very radical bolshevists, absolute communists. But as I was standing there I was getting wetter all the time in the rain because there was no roof, and my feet were getting wetter and wetter because every one of us was standing in mud over our shoetops. Finally I blew up to the bolshevist leader and said, "You guys call yourselves labor leaders. Why haven't you gone to the bosses and told them for the love of heaven to put down some concrete; there is no sense in asking men month after month and year after year to stand in mud, especially in the weather you have half way up a mountain in the Rhondda!"

And he said to me, "Many's the time we 'ave asked the mawsters exactly the syme thing but always do they say to us, 'You're naught but trouble mykers; out with you; we'll have naught to do

with you!'" And then he went on to say, "If only the masters had some years ago been able to think of us not so much as trouble mykers but trouble finders, 'twould be a better pit to work in the now."

I can imagine those employers over there making exactly the same mistake I find many, many employers making here. They say, "These leaders are radical, aren't they?"

"Yes, see what they say in the papers."

"Then it must mean that my men I had always supposed to be good Christian, American citizens, who have lately accepted the leadership of these men, have also become radicals."

And yet this is not true. Those Welsh managers could have said, "Here are these good husky, upstanding, Christian coal miners in the Rhondda Valley, good, lovable Welshmen; they must have become as radical as these leaders or they wouldn't follow them." Yet that wasn't true. These old fellows in the pit below-ground would say, "Aye, these bolshies, you understand, they do go too far with their extremes. Aye, we moost have order, we moost have law; it's British citizens we are, but, after all, these bolshies do be the mouthpiece for us all, for all of us be fair unhappy."

Grievances of mud over your shoetop, and this, that and the other little things, were such as to have these men convinced that it would require some extremist to come along before the management could be made to face them. So they were willing to accept the leadership of those radicals if those radicals could pull certain chestnuts out of the fire of their discontent over their daily job; nothing more than that.

Look at Your Workers' Experience of Yesterday

During the last three years, my job has been simply to find out what are the chestnuts which make this 60 percent pro-job, this majority group, willing to go along with the minority.

I don't think I can give anything more fundamental as the result of my observations of the worker's mind than this:—that if you want to know what is on your workers' minds today, take a good look at your workers' *experience* of yesterday. If any of you have been in factories where men have gathered around the bulletin board, you have heard them say, "I see here the President says the company has always planned to do so-and-so and so-and-so, but let me tell you my experience. Remember three years ago when such-and-such a thing happened?" And if Jim says, "You're damn right; let me tell you my experience;" and their experience is contrary to what the president would have them believe there on the bulletin board, it is just too bad.

The key to the mind of the worker today is the experience of the worker yesterday. What, therefore, has been the experience of the workers of the country yesterday? It is very simple. It has been the experience of depression, of hard times, of job scarcity, of a time when to lose one's job was to lose everything, to go head over heels into that inexpressible misery of joblessness—all because when a man lost his job here there was no job to which he could go.

Fear

The thing that has lately been on the mind of the worker is the natural result of the strains and tensions and worries and botherations and miseries of hard times. One single word has been the most important word of all during recent years in the explanation of the worker's mind—f-e-a-r, the fear of the loss of the most valuable piece of property in the life of the worker, namely, his job; and most of all, the fear of the loss of that job through the favoritism of the foreman, or other injustice.

I have in mind in support of this proposition, for instance, the situation in Akron. There in the fall of '34 people were falling over themselves to join the union. Why? Everybody would tell you the same story. "You see, we have no seniority rules. The boss, therefore, in my department is going to give extra hours and keep on the job his own friends, and I am not sure that he is a friend of mine. Therefore, I must go and get somebody to protect me." The whole country later on in the spring of 1935 expected a great strike. The strike didn't happen. Why? Very largely because the membership in the union by the spring of 1935 had greatly lessened from what it was in 1934. Why? Because the large employers of Akron had in the interim instituted seniority plans whereby it was possible for an employe to walk into the factory and see that if his name stood high up on the list, he didn't have to worry about the loss of his job before Jim and Frank and Joe down below him had first been laid off. There was no reason for him to pay anybody for protection. Fear had been taken care of.

* * * * * * * * * * * * *

Pride

But I am also sure that no employer can understand why the fear of joblessness should be the terrible thing on the mind of the worker that it is unless he understands one other thing that I have found always on the mind of the worker, namely, his wish to take pride in his job. It is this that explains why joblessness is such a terrible experience. We are apt to think that the working man finds joblessness terrible simply because he has no longer any money in his pocket. Everywhere in England and in France and in Germany, the prayer of the worker is exactly the same; "Give us this day our daily job."

I still hear ringing in my ears the complaint of the old fellow on the docks of London as he said to me, "T'is six weeks since I've 'ad the price of me union dues for the gettin' of a job 'ere on the docks of London; 'Tis six weeks since I've 'ad the price of a bed, me, a man of 75 a-sleepin' night after night out under the skies; and I needn't tell you no drop of water has touched my face this day." I expected him to say, "By the Eternal, the whole system should be smashed," as I have heard other bolshevists say after such an introduction, but he said, "But there are men in there on the docks, thousands of men, who 'ave 'ad a job every day for weeks; every day for weeks, I'm telling you. Aye, every man should 'ave 'is fair chance at the job."

* * * * * * * * * * * * *

Self Respect

You make the greatest mistake in the world if you think that prayer for the daily job is nothing but a prayer for the daily bread. On the contrary, it is a prayer for something that fills the pocket, fills the stomach and also fills the soul. I found that the importance of a job to a man is the fact that that job, beyond any other single thing in the world, helps him to think well of himself as a man among his fellow men—that if he has a job then he can be perfectly sure that the doing of it gives him a right to feel that since his job is essential to the next job, and those two jobs are essential to the third job, then by his job he is connected up with all the values contributed throughout the whole circle of mankind.

So the job has a spiritual significance: a man needs help to understand it. He

would like to know—to an extent that you don't realize or believe—just what becomes of the stuff that he handles there in your plant; he would like to have the feeling that if he travels on the Pennsylvania Railroad he is traveling upon ballast that he himself has helped to get out—just as I got a big kick from putting in the furnace of the good ship *Mauretania* the coal I found had come from the very same mine and the very same seam in which I had worked over there in Wales.

The fear of joblessness follows from the worker's wish, always down deep in his heart, to enjoy pride in his work. So I give you those two words so far: fear —fear in hard times; pride at all times.

* * * * * * * * * * * * * *

Facing Prosperous Times—Hope

But suppose that we soon get rid of hard times and that that job in your plant that used to run only two or three days a week becomes a job every day. Suppose also that you have made sure that favoritism isn't going to take this man tomorrow and let that man go. Suppose further that if the men in your plant do lose their jobs they can go down the road a mile or two and get other jobs—what then? That means that you have changed tremendously the daily experience of your regular daily worker. So where fear was, hope enters:—no longer the fear of holding on, but now with prosperity the hope of *getting* on!

I believe it is going to be much easier for the ordinary employer to keep in close touch with his workers under conditions of prosperity than it was under conditions of fear. When everybody is fearing the loss of his job, such an outside protector as the vertical unions have been sending around can make himself fairly useful: when the employer himself had enough trouble to keep his plant going, it isn't to be wondered at if he found it very difficult to give his men full assurance against the fear that they might lose their jobs. But with prosperity bringing into the mind of this self-same worker a revived hope, then the average employer has an infinitely better chance to compete with this belligerent outsider.

As a matter of fact, I believe these vertical unions which have recently been trying to organize steel, automobiles and rubber can be called "hard-time unions." They have been brought into being in these industries by the scarcity of the job, a scarcity of the job which brought with it fear which called for the help of a belligerent outsider. The difficulty with the verticals is that when times become better then any union which takes in all classes from unskilled up to the skilled has nothing with which to bind itself together. It lacks the cement that holds the skilled men together in order to fight for the maintenance of their differentials and the recognition of their skill in terms of standing and that "spread" which marks their success as craftsmen.

So, for picturing the worker's mind, I name, first, fear as tending to get into the background as rapidly as we come into prosperity; secondly, pride—pride which the worker wants to enjoy at all times; third, hope—hope for a better, higher job. I, therefore, hope that today every employer will sit down with his organization and say: 'Have we done, in the first place, everything possible to bring down to a minimum, as close to zero as possible, any fear, whether justifiable or unjustifiable, on the part of our workers, that favoritism or any other cause may cheat them out of their job? Have we done everything we can to regularize our work?'

If, first of all, every employer would do that, then he would be ready to capitalize the coming of prosperity; then when prosperity does come he can well say to his organization: "Have we done everything we can to justify our worker's hope and belief that if he does the best he can, he has a chance first of all to take pride in his work, and secondly, to have the first chance at any promotion given around here for which he has the capacity?"

Be Fair to Foremen

That means, for one thing, that industry pretty generally has to do some heart searching with respect to its own foremen, because during the depression many organizations had to reduce their foremen: many that were paying their foremen salaries had to put them on a day rate. In many cases the workers under those foremen have been brought back closer to their 1929 level than have the foremen over them. But no employer can hope to have the assistance of his foremen in routing out possible labor troubles unless his foremen have no right to believe that he runs his business on the proposition that the wheel that squeaks the loudest gets the most grease.

He must also make sure that the matter of promotion is taken care of properly. Further, if he has any skilled men, he must make sure that they, too, do not have the right to believe that his unskilled men, as the result of gains that have been made perhaps by a vertical union, have been raised more than they. I don't mean that you must make sure that the gap is always the same, but, nevertheless there must be some recognition that skill is not less valued than formerly.

Make Union Dues Unnecessary

All the above means that when you come into close touch with the mind and the heart of this average, typical American worker, you find that he wants to have a minimum of fear, a maximum of pride and a maximum of hope. This, in fact, is what bothers the labor union leaders, because they find these men simply won't keep on paying dues unless they can get certain advantages in the way of improving the job. Every labor leader knows that this fellow will be perfectly willing to have those advantages in the daily job come to him through his employer at nothing a month rather than through the leader at $1 or $2 per month.

I want finally to leave with you my observation that this average worker,

this 60 percenter, this man who is mainly pro-job rather than pro-union or pro-company, is a very reasonable sort of chap. He certainly is not Red. I have listened to hundreds of communist meetings—here in Cincinnati, up in Detroit, over in Chicago—not to hear what the Reds say because they all say exactly the same thing, but to notice the reaction of the workers, to see whether they were taking it or not.

I asked a man down in McKeesport, Penn., how the Reds had been getting along—a man who hadn't had more than two days of work a week in months and months, and yet seemed to be very reasonable. He told me—"The Reds ain't gettin' nowhere here."

"Why not? I thought McKeesport was famous for its Reds."

"Oh, no," he said, "why, nobody needs to read the paper as I do and try to think about it, and to listen to the radio and try to use his head without knowing that them radical fellows won't get nowhere because they promise too goddam much too goddam quick."

Knowledge of Applied Psychology Needed

When I arrived in Europe some years ago to study industrial relations, every-

body told me to "Go down to the hot spot of Europe, the Saar Valley. There, in addition to the ordinary difficulties between capital and labor you have French management trying to get along with German miners."

I hot-footed it down to the Saar Valley and got a job working in the coal mines. But I couldn't find any hot spot. Everything was going along very well with the Germans thinking quite highly of those French engineer-managers. Why? Because every French engineer in every engineering school in France is taught that while it is necessary for him to understand how machines work, it is equally necessary for him to understand a certain machine which begins with the tip of a man's finger and ends with the top of his head. As a result, in every mine in France, and in most French factories, the management is made up of engineers. And those engineers are never seen in an ordinary big French mine office until ten-thirty every morning. Why? Because every one of these high-grade French engineer-executives spends at least two hours every morning down underneath talking with his miners, and when you ask him why, he says, "Because we are taught in the schools that there is no foreman smart enough, trained enough, educated enough to handle the whole problem of human relations down there underground so we take that on ourselves and every day we visit this or that part of the mine until we have been all around, continuously."

So when I would be working with my fellow German miners, along through the darkness would come a beam of light and up would come one of the most noted engineer-managers of France. In his broken German he would say to these men, "How are you? How are things going? How is the machine? How is the ventilation? Are they keeping down the water? Are we doing everything we possibly can to help you get out the coal and earn more money?" He would talk about economics and how the cost of living these men had been complaining about would be decreased if the management could somehow help every miner to earn more and thus reduce the price of coal.

When he had gone after his, "Thank you, we will see you later, Auf Wiedersehen!", these Germans would turn to me and say: "Um Gottes liebe! For the love of God! What do you think of that? In all our school-days in Germany we were taught we must hate every Frenchman, and yet we have never in all our lives seen a German official of corresponding rank ever dream of coming down here except to give us hell!"

You can't have a hot spot under conditions of such human understanding.

Contact, Understanding, Sympathy

So all I've said today stresses contact, understanding, sympathy. Don't let any representatives, whether from outside unions or inside company unions, give you the feeling that you don't have also to maintain your relations with the men they represent—through your foremen, through your paymaster, through your company guard, through everybody all over the place who represents you.

Finally, I think there is a fair chance that following all this difficulty we are going to have a much better understanding of each other than ever before. In my observation the average workingman in America has come through this depression marvelously: he has had his faith in the American system less jarred than you and I; he has believed in it more and stood by it better. That's why I believe we are soon going to get together better in industrial relations.

* * * * * * * * * * * * * *

Don't believe these people who say it is complex, that it is mysterious, that your fellow-Americans who work for wages are no longer as good Americans as you, that they are no longer the kind of people you grew up with. But do bear in mind that they want to believe in themselves as men who show themselves approved there on the job, that exactly as you and I they live and move and have their being on their job, because their job is the greatest help to their self-respect exactly as it is to you and me.

Superintendents' Association

New Haven Trap Rock Co., New Haven, Conn., has an Association of Superintendents. This was described in Rock Products several years ago by the editor, who was privileged to attend one of the meetings. Since then the organization has been perfected. Its purpose and scope are described by A. L. Worthen, vice-president of the company, in Information Circular 6920, U. S. Bureau of Mines, on "Quarrying and Crushing Methods and Costs at the Plainville Plant" as follows:

"Once a month the keymen of the company gather at some central point to hold a dinner and meeting. The general superintendent proposed these meetings and the superintendents started them in 1927 under the name of the 'Association of Superintendents of the Connecticut Quarries Co., Inc.' Membership now includes the general manager, vice-president of administration, treasurer, sales managers and salesmen, office manager, bookkeeper, and safety engineers, besides the superintendents and assistants at the various quarries and distributing bins. The organization is now known as the Association of Superintendents of the New Haven Trap Rock Co.

"The association has for its object 'to create a spirit of social relationship, harmony, and coöperation, with educational features pertaining to the trap-rock industry that are so seemingly necessary to make for real progressiveness and mutual understanding.' Part of the expense of running this association is paid by the company and the remainder in dues.

"After dinner the order of business is as follows:

(1) Roll call
(2) Reading minutes of last meeting
(3) Reports of secretary and treasurer
(4) Report of executive committee
(5) Report of safety committee
(6) Report of other committees
(7) Unfinished business
(8) Remarks by general manager
(9) Remarks by vice president of administration
(10) Remarks by sales managers
(11) Remarks by general superintendent
(12) Monthly cost analysis
(13) New business
(14) Speakers
(15) Adjournment.

"During the meetings comparative figures on monthly costs are submitted to the various superintendents and discussed. An estimate of future business is given by the sales manager.

"These monthly contacts among men of the various quarries, the general office, and the sales force are very helpful in promoting a better understanding of each other's problems and create a spirit of ready coöperation between all departments. Social relationships and friendliness among the members of the association are furthered by an annual summer outing and a Christmas party."

Japanese Cement

United States War Department is reported to have authorized the purchase of 20,000 sacks of Japanese cement recently, through the $8,147,000 appropriation for strengthening and replacing coast defenses in the Hawaiian Islands. The purchase was made despite the fact that the act appropriating the funds specified that American materials were to be used. It was explained that the purchase was made because of a shortage in American cement, due to the Pacific Coast maritime strike.

Reopen Cement Plant

Great Lakes Portland Cement Co., Buffalo, N. Y., has resumed operations after a brief shutdown. A 10% increase in wages for all employes was put in effect.

Concrete Products
Cement Products
TRADE MARK REGISTERED WITH U. S. PATENT OFFICE
Section of Rock Products

Service—and More Service

MERCHANDISING cement and aggregates as ready-concrete is becoming increasingly popular with producers of aggregate. However, many producers of aggregate look on the manufacture of ready-mix concrete as another business—one that very likely is competitive with that of some good customers.

The tendency of the ready-mix concrete business has been distinctly away from central *mixing* plants toward truck mixers, charged with proper proportions of cement, sand, coarse aggregate and water at central *batching* plants. Of course, the logical place for the batching plant is at the producing point of the aggregates, or at their central receiving point in a large city.

An aggregates producer can have a central batching plant, designed to proportion concrete scientifically, without necessarily going into the ready-mix concrete business. He can develop a service for ready-mix concrete contractor customers and avoid duplications of plant.

New batcher and bulk cement bin of Plaza Sand and Stone Corp., Yonkers, N. Y.

A SHIELD
AGAINST THE FLAMING
SWORD OF FIRE...
A CONCRETE
HOME
Concrete home of Mr. and Mrs. H. Ralph Heidelbach, Forest Drive and Rolling Road, Catonsville, Maryland. Designed and built by John Earley
WHEN the whining shriek of the fire siren rings in your ears, how good it is to know that your loved ones are safe in the shelter of a concrete home! For concrete won't burn. It stands secure against fire just as it resists the insidious boring of termites, the destructive force of storms and the slow onslaught of decay.
Such protection is unde
worth a lot of money—and y
seem justified in assuming
quite a lot. But it doesn't
in the $6500 price r
example, firesafe concr
tion adds only a few
month to the payme
small expenditure is m
up by savings in slower
and lower upkeep costs.
Of course your concrete
be in any architectural styl
color you choose. And it will be a
livable home that will remain
ing faults. It will be
snug and dry in winter and cool in
summer. Send for free booklet,
Designed for Concrete, showing 55
homes by leading architects.
How to Get a Concrete Home
Ask a nearby concrete products man or concrete contractor for names of architects and builders experienced in concrete.
Tell the architect you select that you want concrete walls, floors and a firesafe roof.
Have your plans figured by one of the rapidly growing number of builders and realtors who have built concrete homes or who are specializing in this type of construction. As a rule you will get the best bid and the best job from a builder experienced in concrete construction. Let nothing shake your determination to obtain the best value for your home-building dollar in today's market. A FIRE-SAFE CONCRETE HOME
PORTLAND
Dept. A2-5, 33 West Grand Avenue, Chicago, Illinois

This advertisement appears in February in home magazines going to 3,500,000 families—including YOUR best prospects. The opening gun in an enlarged campaign.

Cooperate WITH THESE ADS AND DOUBLE YOUR BUSINESS IN *1937*

It's up to you! Why stop with foundations only when you can sell the *whole* house—concrete masonry for outside walls, veneer, back-up, partitions; precast floor joists throughout! That is the way thousands of homes will be built this year in communities where concrete products manufacturers are *going after* the business. We'll furnish you national advertising inquiries and other helps—if you'll do your part.

Advertise yourself as the local headquarters for facts and estimates on concrete homes. Tie yourself in directly with this national advertising. Build a concrete demonstration house, or get a live contractor to do so.

Sell your realtors and speculative builders on featuring the beauty, firesafety and big value of concrete homes.

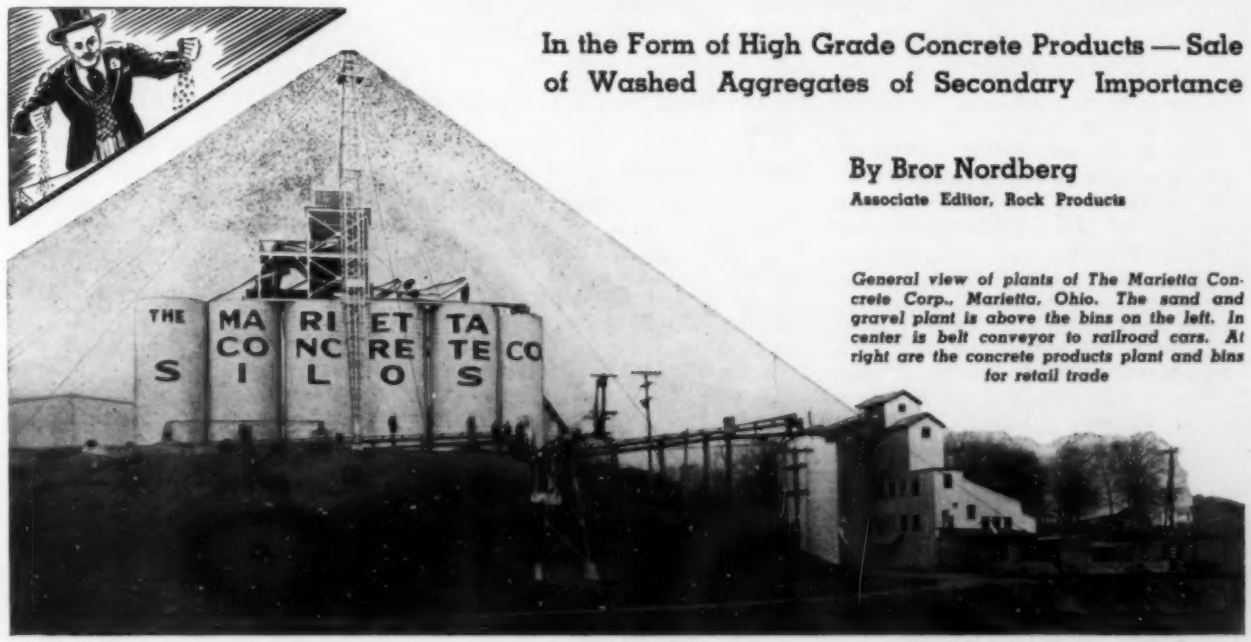
Double your business this year? Well, why not.

PORTLAND CEMENT ASSOCIATION
Dept. 3-45, 33 West Grand Avenue, Chicago, Ill.

SAND AND GRAVEL MERCHANDISED

In the Form of High Grade Concrete Products — Sale of Washed Aggregates of Secondary Importance

By Bror Nordberg
Associate Editor, Rock Products



General view of plants of The Marietta Concrete Corp., Marietta, Ohio. The sand and gravel plant is above the bins on the left. In center is belt conveyor to railroad cars. At right are the concrete products plant and bins for retail trade

THE Marietta Concrete Corp., Marietta, Ohio, as its name implies, produces practically "anything in concrete." Sand and gravel are produced, a complete line of concrete products is manufactured and ready-mixed concrete is sold locally. The manufacture and sale of storage systems, built from precast staves, has been the company's main business since 1916. Such systems are being sold extensively for the storing of sand and gravel, crushed stone, lime, cement; for water tanks; and for farm usage.

The present products plant was built in 1928. The aggregate plant of the Inland Sand and Gravel Co. was bought in 1928 and rebuilt in 1930, primarily for the production of washed aggregates to be used in the manufacture of concrete products. However, considerable sand and gravel are retailed.

It can be said that the aggregate plant was designed to facilitate the ready transfer of aggregates to the products plant, and that the latter was so laid out as to readily receive these aggregates. The sand and gravel plant is located on a hill, 60 ft. above the surrounding country—taking advantage of the site to eliminate elevating of finished aggregates.

Glacial Deposit

A 17-acre gravel bank is being worked to a depth of 85 ft. The deposit is of glacial origin and contains a highly angular gravel. It extends to a depth of 125 ft. and is practically free from overburden.

The manner of excavation is by a ¾-yd. Sauerman slackline, operating from a 100-ft. steel mast. The two-drum Sauerman hoist is driven by a 50-hp. Allis-Chalmers motor through a Dayton cog-belt drive. The present plant ca-

Delivery trucks for ready-mixed concrete

Sand and gravel pit at Marietta, Ohio, being excavated by a slackline to a depth of 85 ft.

pacity is 60 tons per hour. The plant design is such that by replacing the ¾-yd. bucket with one of 1½-yd. capacity and exchanging the 50-hp. motor for one of 100-hp., the plant output can be doubled. This change can be made easily overnight.

The excavator has a 1000-ft. span but at present the excavation is 400 ft. from the mast. The bucket load is tripped at the top of the plant to a steel hopper of 30-yd. capacity. A hand-operated gate regulates the flow to a 12-ft. by 40-in. Telsmith revolving screen, driven by a 7-hp. motor. The screen is equipped with a sand jacket to remove minus ⅛-in. fines. Wash water is applied at the point of discharge from the hopper to the revolving screen and from sprays within the screen.

Sand Separation

Six sizes of aggregate are produced. These are a 2-in. or 1½-in. gravel, ¾-in. gravel, ⅜-in. gravel, concrete sand, building sand and asphalt sand.

Sand is separated from the gravel sizes through the revolving screen, and passes down a slightly-inclined 18-in. steel flume to the sand drags. There are two 24-in. by 14-ft. Columbus Conveyor Co. drags, each driven by a 3-hp. motor. The first one reached by the flume is the building sand drag; the second, the concrete sand drag. The flume, on its way to the farther drag, passes over the building sand drag, and at this point an arrangement is worked out to control the proportions of the two types of sand, according to demand. For about 3 ft. of the sand flume, above the masons' sand drag, a ⅛-in. mesh screen makes up part of the bottom, according to proportions desired.

If masons' sand only is desired, this screen makes up the entire width of the bottom of the flume. When both sands are being run, ⅛-in. wire makes up part of the bottom of the flume, the number of inches of width depending on the quantity of each sand desired. For an ordinary run, the screen would make up possibly 5 in. of the bottom of the flume, the remaining 13 in. being solid bottom. A vertical wall separation is set up, so that sand in 13/18 of the flow would pass over the solid bottom to the concrete sand drag beyond.

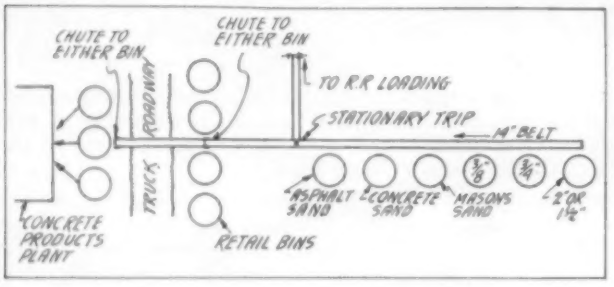
The other 5/18 of the flow passes over the screening surface, and that part not passing through is run off as waste sand. The throughs go to the masons' sand drag through a chute equipped with another mesh bottom for further control.

The back wash from both drags passes through a flume to a 72-in. Telsmith sand settling tank for the production of asphalt sand. This product averages 50 mesh.

Gravel Sizing

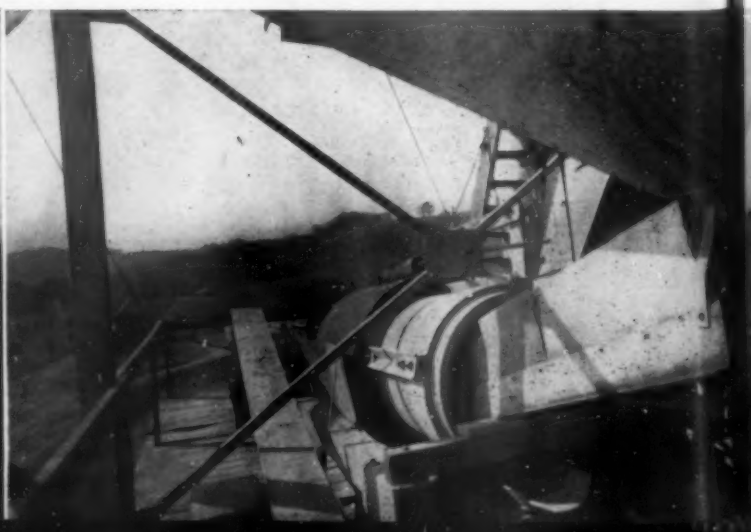
Gravel from the rotary screen passes below to a 3x6-ft. double-deck Simplicity vibrating screen, driven by a 3-hp. motor, where it is washed by sprays and sized and chuted to the proper bins below. Oversize from the top-deck is crushed by a 9x16 Cedar Rapids jaw crusher. The crusher product is returned to the rotary screen by a Jeffrey bucket elevator, 25 ft. centers, driven by a 3-hp. motor, and is recirculated until it passes the screen.

It could be said that the flexibility of the plant and its adaptability for the control of aggregate sizes for use in the



Ground plan of The Marietta Concrete Corp. plant. The conveyor reaches all plant divisions

BELOW, LEFT: View on top of sand and gravel bins, showing two sand drags. The steel chute is from rotary screen above. RIGHT: Rotary screen over the bins, fed from steel hopper. Note screen cleaner in center



concrete products plant depend upon its storage system and its system of belt conveyors .

Stave Silos

Thirteen concrete silos, each of the type sold for storage of aggregates, cement and other products, make up the storage system. These silos were built from 30x10x2½-in. staves cast in the company's products plant.

Five silos, each 40 ft. high by 18 ft. in diameter, with a capacity of 350 tons, and one of 250-ton capacity, take the aggregates, as produced, from the plant and serve as the foundation for the screening and washing plant. The three bins closest to the hoist house are for the three gravel sizes; the fourth bin is directly below the masons' sand drag; the fifth is below the concrete sand drag, and the smaller one receives asphalt sand from the settling tank through a trip arrangement. Asphalt sand is retailed directly by truck from this bin.

Handling of aggregates for car loading, for transfer to the retail bins and to the concrete products plant storage, is done by a system of belt conveyors, all equipped with Cincinnati rubber belts. Four retail bins are provided adjacent to the truck roadway below. Directly across the drive from the retail bins are three bins serving the concrete products plant. Each of these bins is filled from the silos above at the plant.

A Jeffrey conveyor, on 180-ft. centers, equipped with 14-in. Cincinnati belting and driven by a 5-hp. motor, travels the length of the plant bins above, with its head pulley directly above the retail bins. About 90 ft. from the tail pulley of this conveyor is a stationary tripper which makes it possible to transfer aggregate to a 50-ft. centers Columbus Conveyor Co. 16-in. belt conveyor for shipment by rail. The travel of this belt is at right angles to the travel of the main belt and it passes over a railroad siding.

Belt conveyor from sand and gravel bins to railroad car loader, concrete products plant, and retail bins

When loading retail bins, the aggregate bypasses the tripper and is chuted to the proper retail bin. In loading the concrete products plant bins, the long belt discharges directly to another Columbus 16-in. belt conveyor, 50 ft. centers, and the aggregate is chuted to the proper bin. Two men handle the entire operation.

Blending Aggregates

Hand gates on each plant bin are opened and all aggregate is given a final washing as it pours out to the long conveyor. Any blending of sizes can be accurately controlled. Approximately an hour is required to load a standard railroad car. The retail bins are 10 ft. in

Machines for manufacture of precast silo staves and concrete block

BELOW, LEFT: Close-up view of sand drags on top of sand and gravel bins. One is for concrete sand, and the other is for mason's sand. RIGHT: Stationary tripper which allows flow from plant bins to retail bins. Chute in center leads to car loading conveyor

Close view of the concrete products plant, with storage in foreground

diameter by 45 ft., with a capacity of 150 tons, and the three concrete products plant bins are 10 ft. by 45 ft. The latter bins are higher to permit flow by gravity from gates near their tops to the mixing equipment. They are equipped with truck-loading gates below, to serve also as retail bins.

Water Supply

Wash water for the entire plant as well as the pressure for washing material to the path of the Sauerman bucket, in the pit, is furnished from the Muskingum River by a 4-in. Dean Hill centrifugal pump under 280-ft. head. The pump is driven by a 40-hp. motor.

Concrete Products

Aggregate from the three bins adjacent to the concrete products plant is used for the manufacture of staves and other products, as well as for a ready-mixed concrete plant within the building. Pre-mixed concrete aggregates and cement are batched in a weigh-batcher and weighed by a Fairbanks-Morse scale. Deliveries are made in two 1-yd. and one 1½-yd. Jaeger transit mixers.

While practically all types of concrete products imaginable are manufactured, as has been mentioned previously, the silo made from precast staves is of major importance. The company has grown, in 20 years, from one of the smallest silo companies to its present ranking as one of the largest in the world. Silos for all farm purposes are shipped to any state east of the Mississippi river and as far south as the Carolinas and Tennessee, while those used for aggregates, lime, cement, etc., have nation-wide distribution.

Equipment includes a 50-cu. ft. Besser mixer, a Besser "Super-Block" machine, and two silo stave Besser machines. Staves for all purposes are of sand and gravel composition, 30x10x2½ in. thick. Each stave machine can make 7 staves per minute. They are made over special molds and are tongued and grooved on all four sides to form a book-like construction. They are transferred from the machines by lift-trucks to steam-curing rooms. After 48 hours they are transferred to the storage yards and are wet cured for two weeks, but a large storage area allows each unit to be cured for months before shipment.

At the present time, the company is employing 30 erecting crews. An average silo or bin of the type and size used in the company's own sand and gravel plant is erected in 3 days. Pressure stresses, due to internal loads, are taken care of by ⅞-in. lugs spaced according to the load to be carried. Silos and storage systems are furnished without exterior coating, or may be water-

Sample exhibit of precast silo stave bin construction. Block storage is in background

Test concrete house erected on Marietta corporation's grounds, attracts many visitors

proofed either inside or outside, or both. Many water-tank installations have been made, and others for the storage of thousands of barrels of bulk cement.

Other products include the 8x8x16-in. smooth and rock-faced block, 5x8x12-in. and 5x4x12-in. building tile, the "Air Sealed" concrete burial vault, precast joists, cast stone, ornamental concrete and special units. A comparatively recent development is the manufacture of "Coloroc" tile and trimstone. The former is a glazed tile in mineral colors for floors, wainscoting, sills, etc. The general line of concrete products is shipped over a radius of 100 miles. The company operates 4 trailer trucks of 15-ton capacity or less for such shipments. In October precast units for construction of a concrete house were made, and a 6-room house was built on the grounds.

Puzzolan Cements Gaining Wider Attention

Occupy Prominent Place in Program of Annual Meeting of American Concrete Institute

THE ANNUAL CONVENTION (the 33rd) of the American Concrete Institute at New York City, February 23-26, as usual, provided a large amount of interesting and instructive material for digestion by those who manufacture cement and aggregates as well as by those who use them to make concrete for every purpose.

It is not possible here to touch on more than a few high spots. The papers and discussions are all published in detail by the Institute. For our purpose they may be divided roughly into two classes: (1) those containing data that should be useful in promoting the use of concrete; (2) those dealing with experience had with concrete and various types of cement and aggregates. The latter should be useful to producers and manufacturers in improving their products, or at least in providing qualities that users demand.

Promotional

Helpful in promoting more uses of concrete can be classed the following papers: "Notes on Concrete in France, Germany, Great Britain and Switzerland," one by F. R. McMillan, director of research, Portland Cement Association, and one by A. J. Boase, manager, structural and technical bureau, Portland Cement Association. Both papers were illustrated by lantern slides. These papers showed that European practice in the use of concrete has been more daring, in the case of many engineering and architectural structures, and probably in the opinion of some, more beautiful. These papers certainly left an impression that we have far from exhausted the possibilities of concrete as a structural material.

The paper "Effect of Vibration on Quality and Uniformity of Pavement Concrete," by F. H. Jackson, senior engineer of tests, U. S. Bureau of Public Roads, in that it demonstrated ways in which the construction of concrete pavements may be improved, might also be considered promotional. His conclusions were very much in favor of vibration.

"Earthquakes and Reinforced Concrete," by J. J. Creskoff, consulting engineer, Philadelphia, Penn., was another paper that could be made use of to sell concrete for earthquake-proof structures. This paper is very complete and could be read with profit by all interested in the promotion of concrete; for, as the author points out, no part of the United States is free from the hazard of earthquakes.

Mr. Creskoff described earthquakes and their characteristics, the kind and intensity of vibration, and how buildings are designed to resist the stresses set up by these vibrations. Because of comparatively recent research and development of engineering theory and practice, it is possible to so design structures that they will resist destruction of any probable earthquake, unless they happen to be on the site of the actual fault (crack). Reinforced-concrete, because the building constructed of it can be made a unit, which is the real key to earthquake-proof design, is an ideal material to use if one would avoid damage and save human life. The extra cost of designing and building a reinforced-concrete structure that will be earthquake-proof as well as fireproof is about 10%.

Experiences—Cement

In the second class, or "experience" type of papers, the most interesting were those dealing with cement. "The Whats and Whys of the New Federal Specifications for Portland Cement," by Ben Moreell, commander, civil engineer corps, U. S. Navy, was an interesting discussion of specifications adopted September 30, 1936, by the Federal Specifications Board for all federal public works. These have not yet been published in complete form, but copies of the technical requirements were made available at the meeting.

There are four specifications: (1) portland; (2) portland, high early strength; (3) portland, moderate heat of hardening; (4) portland, sulphate resisting.

Commander Moreell prefaced his discussion with an historical resumé of American cement specifications. He said that while very early notable differences in various portland cements were recognized by users, the objection on the part of manufacturers to more than one standard was at least partly justified; that the rapid development of the industry in this country was undoubtedly due to a single standard. There had always been a greater diversification in France.

He said the demand for special cements in the United States was not a demand for lower priced cement, but to obtain certain desired results. He was not in favor of going too far in that direction and said there should be some restraining influence on "birth control" of special cements. The new federal specifications were then explained in terms of how they differed from the old.

The new specifications cover chemical composition by limiting the calculated limiting amounts of the oxides of magnesium, aluminum, silicon and iron, and the tricalcium aluminate ($3CaO \cdot Al_2O_3$) but do not attempt to specify proportions of tricalcium silicate or dicalcium silicate. For standard portland and high early strength portland, the *maximum* amount of tricalcium aluminate is 15% of the whole composition. For moderate heat of hardening portland cement it is 8%; and for sulphate resisting portland cement it is 5%. Magnesia (MgO) is limited to 5% in all but the sulphate resisting, where it is reduced to 4%.

Alumina (Al_2O_3) may be a maximum of 7.50% in standard and high early strength cements, 6% in moderate heat of hardening and 4% in sulphate resisting portland cement. In the case of iron oxide the percentage is 6% for all

but the sulphate-resisting type, where the limit is set at 4%. Sulphur anhydride (SO_3) limits are 2% for the normal, 2½% for the high early strength, 2% for the moderate heat of hardening and 1¾% for the sulphate-resisting portland. In the case of moderate heat of hardening portland cement the *minimum* percentage of silica (SiO_2) is 21% and in sulphate-resisting cement 24%; not specified for the other two.

Commander Moreell said that it was recognized that chemical and physical properties of cements are so interrelated, or interdependent, that the committee merely picked chemical limits of various cements which had been shown to have satisfactory properties. The specifications are certainly much simpler than those previously used and more understandable even by non-technical cement men.

Aside from the simple chemical requirements, the most interesting are those for fineness. These are a minimum specific surface (by Wagner turbidimeter) of 1500 sq. cm. per gram for standard; 1900 for high early strength; 1800 for moderate heat of hardening; 1800 for sulphate resisting—none requiring extremely fine grinding.

Commander Moreell admitted that eventually users might have to pay premiums for such special cements.

Puzzolan Cements

R. R. Clark and H. E. Brown, Jr., U. S. Engineer Office, Portland, Ore., in their paper, "Portland-Puzzolan Cement as Used in the Bonneville Spillway Dam," went through the history of cement investigation and selection by the U. S. War Department which led to the selection of a portland-puzzolan cement rather than a modified, or low heat of hardening, portland cement. The reasons given were that the former made a concrete with lower heat of hydration, higher tensile strength, greater impermeability, greater workability, greater freedom from segregation and lower water gain.

Discussion developed that experience with this portland-puzzolan cement was not so satisfactory as the paper made it appear. P. H. Bates, National Bureau of Standards, chairman of the meeting, stated that such special cements need special treatment or practice, pointing out the abrasion damage to the new portland-puzzolan-cement concrete on this job as an example. D. S. Colburn, vice-president, Marquette Cement Manufacturing Co., brought out something not mentioned in the paper—that a mineral oil had to be used to control setting time, and that in at least one instance too much oil caused difficulty. Mr. Colburn said that the authors had no right to draw such favorable conclusions—that the structure has still to be completed and tried out.

Fly ash—the ash resulting from burning pulverized coal in power plants—is a cause of worry to public utility companies in large cities, for it is hard to handle and dispose of. Raymond E. Davis, professor of civil engineering, University of California, and R. W. Carlson, associate professor of civil engineering, Massachusetts Institute of Technology, after much laboratory investigation of the "Properies of Cements and Concretes Containing Fly Ash," come to the conclusion that it is a good puzzolanic material. It is extremely finely divided and silica is its largest constituent. The chemical composition of fly ash from various power plants did not vary much except in unburned carbon. This varied from a few percent up to 20 or 25%. Obviously, the lower the carbon the better the fly ash as a puzzolan.

Fly ash up to 50% of the cement, the authors said, may be a definite advantage to the concrete. It gave as good results as, or better than, grinding puzzolanas with the clinker. The water requirement was about the same as for portland cement. Greater strengths were obtained at later ages, and shrinkage tests showed about the same as for portland cement. At the end of a year the dried out concrete had shrinkage of only about one-third as much as portland cement concrete. Portland cement and fly ash mixtures gave a concrete more resistant to sodium sulphate and of less heat of hydration than portland cement alone.

Lewis H. Tuthill, testing engineer, Metropolitan Water District of Southern California, contributed a paper "Resistance of Cement to the Corrosive Action of Sodium Sulphate Solutions," in which he describes investigations of cements for the Colorado River aqueduct. He came to the conclusion that "resistance to sulphate corrosion is evidently very sensitive to the influence of chemical composition of the cement, and the basis for the preparation of concretes of high resistance is primarily the choice of a cement of proper compound composition.

His experiments indicated that for a cement dependably resistant to sulphate corrosion the following composition limitations are necessary:

C_3A, not more than	4%
C_3A plus C_4AF, not more than	12%
C_3S, not more than	50%
C_2S, not less than	30%
7 day tensile strength standard briquets, not less than	225 p.s.i.
Specific surface (turbidimeter), not less than	200 sq. cm. per gr.

(This fineness, although desirable for other reasons, is necessary to insure adequate early strength with the above composition.)

Some puzzolan cements gave high resistance, others very little, so that great care and caution must be exercised if dependence is placed on this type of cement.

Products

The only paper on concrete products was the progress report of the committee on the use of high early strength cement for products manufacture, by Benjamin Wilk, committee chairman. He merely confirmed conclusions of short-time tests, previously reported, that 70 lb. of high early strength cement is as good as 94 lb. of standard cement; that volume change and durability are comparable, that there is not much difference in shrinkage; that variations in shrinkage are more pronounced because of the kind of aggregate than the kind of cement. Slag aggregates showed up best in both shrinkage and durability tests (freezing and thawing.) Cinder aggregates showed up the worst. However, he pointed out that there are all kinds of cinders, and he warned that early high strength cements can not be used indiscriminately.

Cement Man President

J. C. Pearson, research engineer, Lehigh Portland Cement Co., Allentown, Penn., was elected president of the Institute for the current year, succeeding Dr. F. R. McMillan, director of research, Portland Cement Association, Chicago, Ill.

Expanding Operations

BREMERTON CONCRETE PRODUCTS CO., Bremerton, Wash., is expanding its manufacturing facilities to take care of increased business. A larger site has been purchased and a new 48x68-ft. structure will be built. Equipment from the present plant will be installed at the new location as soon as the plant is completed.

New Block Plant

POINT PLEASANT CEMENT BLOCK CO., Pt. Pleasant, N. J., began operations in a new plant of 1200 block daily capacity in February. A. Juliano, formerly manager of the Stapleton Block Co., is the owner. New machinery has been installed for the manufacture of concrete and cinder block.

Makes Concrete Brick

WILMINGTON BRICK CO., Wilmington, N. C., has opened a new plant for the manufacture of Dunbrik and concrete blocks. Maximum capacity of the plant is 30,000 brick per day. Brick of all colors are to be made, and shipped after 24 hours fog curing and 28 days in the open air.

Merchandising Concrete Products — Part 4

"Advertising," By Harold O. Hayes

THE alert concrete products manufacturer of today does not wait for buyers to learn of his products by chance, or for them to take their time in making up their minds to purchase. Instead, he brings to bear the most powerful forces at his command to call attention to his wares, and to encourage prompt purchases. Advertising is one of the agencies through which these objectives are achieved.

Too often advertising is thought of as a magic wand which, by waving casually, will cause a flood of orders. Unfortunately, this is not the case. Rather, advertising is a "super-charger" for the sales motor, making for greater vitality, speed and economy of sales.

Increases Prospects

With advertising you may reach far greater numbers of possible users of your products than is possible by personal contact. You can take important messages to this mass of people, regularly at low cost. You can create in the minds of these people a definite appreciation of quality. You may develop a wide recognition of the several properties of your product. You may create interested prospects. You can pave the way for increased sales.

Carefully prepared, effectively produced advertising can impress on the public a high appreciation of the firm's policies, inspire confidence, and increase patronage.

The advertiser who can tell the story to the customer and connect it closely with the buyer's personal interest is the advertiser that produces results. Every concrete products manufacturer can thus increase the success of his business with advertising. But—for lasting benefits, it must be backed with products that fulfill your claims. Don't expect advertising alone to convert losses into profits.

People have different ideas of advertising. Some think of it as a page in a national magazine; others, as space in a local newspaper; Still others, as a swinging radio program; while others think of it in terms of bright lights flashing quick messages through the night, or billboards.

But keen manufacturers think of advertising as a means to build greater sales—a way to increase the effectiveness of the sales force—an effective broadcast of the sales story to large groups of people whom it would be economically impossible to reach through personal solicitation.

Advertising Policy

First step in starting an advertising program is to set up an advertising policy. This is just as important as setting up a sales policy, a price policy or a credit policy. In doing this the manufacturer must decide (1) if he should advertise; (2) how much he should advertise; (3) how he should advertise; and (4) where he should advertise.

There is no formula to use as a guide in charting a course, but there are fundamentals, an understanding of which will help to get greater value from your advertising dollar. Factors influencing the formulation of an advertising policy include size of plant, current production, unexploited market possibilities, competition, markets offering greatest possibilities, the sales plan, funds available and the various advertising mediums and their respective cost.

Many firms budget advertising appropriations in relation to sales. This percent varies widely, according to the type of merchandise or product. Even in the field of concrete products, conditions vary so that it is impracticable to give a figure which would be applicable to all manufacturers. But, based on general figures of expenditures of manufacturers with similar marketing problems, an appropriation of 3% of sales may be used as a working basis from which to start in planning.

But before setting up an arbitrary figure as an appropriation, a thorough study of mediums should be made. After that study you should be satisfied that with the advertising as planned you will effectively reach the largest number of prospective users of your products at the lowest cost. To do this, through a process of elimination, you should determine the order of importance and value to you of the respective advertising mediums.

Local Advertising Good

Since the concrete products business is essentially of a local character, the individual manufacturer can quickly eliminate national magazines from his consideration. However, occasion might warrant consideration. Such was the case when the National Cinder Concrete Products Association produced and distributed a magazine to promote the use of cinder concrete masonry. Or, should the National Concrete Masonry Association propose a national advertising program, members of the industry might well be justified in participating because of the influence of such advertising on local prospects.

Such programs have been successful in other industries; for example, certain groups of automobile dealers who have participated in coöperative local and national advertising. This is a matter of possible future interest, however.

Of immediate concern is the newspaper, and other local advertising mediums. In larger cities, regular display advertising quickly runs into money, and will have a large waste circulation. However, many papers have a weekly real estate and home-building section and these deserve consideration. For it may well be the best local "market place" for building products. Local newspapers also may be economical in merchandising a model or demonstration house. Frequently advertising departments of these newspapers will welcome an opportunity to put out a feature section about such a house, soliciting all who supply material and who do work for advertising.

When that is done, generous editorial copy is included about the project, so that the story may dominate the paper. Good will of the newspaper may also result in other publicity. So the newspaper is worthy of consideration from these angles. In many cases there are also local construction weeklies. These publications have an excellent circulation for the products manufacturer for they go direct to the contractor and builder; often to the architect and real estate man—so that most of the large buyers and users will see the message.

Blotters, Booklets

Then there is direct mail. Direct mail may include blotters, calendars, form letters, personal letters, broadsides and booklets. Inexpensive blotters may be obtained, and they are often effective reminders to contractors of you and your products. Copy on the blotter should be limited to some brief, terse message, without attempting to cover the whole sales story of the product; perhaps a list of your various items, your trade mark, a good motto, and *always your name and telephone number,* in good legible type. An attractive illustration will increase the cost of the blotter, but it will also, increase the chance that the blotter will be kept and used. If blotters are used it is a good plan to mail one at frequent intervals.

Calendars are much like blotters in

their use and appeal. Copy should be short, terse, and to the point. The more attractive the illustration the greater the possibility that the calendar will be used—and thus accomplish the desired result. One manufacturer of concrete products machinery has been quite successful in gaining wide circulation for his attractively illustrated calendar.

Letters

For an intensive drive for consumer business, either the form letter or personal letter is desirable. If Dodge, or other construction reports are used, letters of this type are an inexpensive way to introduce your proposition to the prospective builders. It is impossible to tell a full sales story in such a letter. But an introduction to your product may be made. This should prepare the way for a personal call, or invite a request for available literature. But an objective should be determined, and stuck with. And it should be remembered that such letters have limits as to what they can accomplish.

Since many construction reports are "progress" reports, and some are made after it is too late to make a sale, it is important to check over these reports and select from them the real prospects. Much unnecessary expense can thus be saved. In considering printed literature, it is often not economical for the manufacturer in smaller markets to prepare comprehensive literature describing his products. In such cases, an inexpensive price list may be prepared for contractors.

Use Illustrations

For home builders, impressive well-illustrated literature may often be desirable. To take care of this requirement, suitable literature may be obtained from the Portland Cement Association at nominal cost. A variety of such literature is available with space for imprinting. Use of this literature also wins the manufacturer the prestige of a relationship with this national organization.

Bill boards may be effective. If used, the important consideration is a location where a substantial number of prospects will see it. Use of billboards in general is better adapted to low-cost merchandise which is purchased frequently by large numbers of people, rather than by manufacturers who make large but infrequent sales to individuals. There are exceptions to this rule, as with all rules. And bargains in bill boards should not be overlooked. Particularly in small markets, permanent signs may be erected at low cost and be effective in building recognition and acceptance of the product.

Few concrete products manufacturers have used radio. And it is doubtful if it has any extended possibilities in this field. In one of our large cities a manufacturer has used a spot announcement with good results. And it is possible that others may find limited radio programs at certain seasons of the year a satisfactory and economical advertising medium.

Having studied these various possibilities, it is a good plan to chart all in a table, listing the cost and number of people who would receive the message. From this summary, a quick and accurate picture can be had, and a well-organized plan can be set up and put in operation.

Elects Officers

WISCONSIN CONCRETE PRODUCTS ASSOCIATION elected Ed. Olson of Oshkosh president at its February convention in Milwaukee. Other officers are Walter J. Manhardt, Milwaukee, vice-president; L. E. Schwalbe, Wauwatosa, secretary-treasurer; and Walter A. Sherman, Milwaukee, executive secretary. Directors include Mike Engersbach, Milwaukee; A. W. Grube, Sheboygan; Charles Clare, Madison; Arthur Sorenson, Racine; A. Kruschke, Eau Claire; and I. J. Westervelt, Wausau.

C. D. Putnam, Washington, D. C., chief field representative of the planning section in the suburban division of the resettlement division, spoke on "Planning National Home Projects." The future housing market, as being promoted in conjunction with the Federal Housing Administration, was discussed by W. G. Kaiser, Portland Cement Association, Chicago. "The Value of Advertising in New Housing Promotion" was the subject of a talk by W. D. Allen, Portland Cement Association, Chicago. Other speakers were representatives of Milwaukee banks, building and loan associations and insurance companies.

Proposed State Cement Plant

NORTH CAROLINA may consider building and operating its own cement plant, according to legislation just begun. The bill will empower the state highway and public works commission to procure a site and to erect equip the plant within the state for use in state construction projects.

Cement Contract

MONOLITH PORTLAND CEMENT CO., Los Angeles, Calif., was recently awarded the contract for 30,000 bbl. of cement for use in the Spillway of San Gabriel dam No. 1.

Cement Concern Acquires Property

EDISON CEMENT CORP., West Orange, N. J., recently leased five acres of land at Rahway, N. J., to be used by the company for storing a lime sludge which will be used in the manufacture of cement products.

Cement Demand Up

PORTLAND CEMENT shipments thus far in 1937 are running in advance of forecasts. Demand has been stimulated by the unusually mild weather which has allowed the continuance of construction operations entailing the use of masonry in sections of the country where normally activities are largely suspended during the winter months. Also, the continued upsurge in building in the South and other areas not affected by frost has accelerated shipments.

State Cement Business?

WASHINGTON STATE may possibly go into the cement business if a bill introduced by nine senators is passed. This proposal would authorize the department of public service to buy on contract two years' supply of cement to be resold to counties, cities and other political subdivisions at cost.

Gypsum Expansion

UNITED STATES GYPSUM CO., Chicago, Ill., has approved plans for an addition to its Los Angeles plant to consist of a one-story building and basement, 100x410 ft., which will be used for the production of building papers, chip boards and roofing felt.

New Talc Mine

W. H. TRAVIS, Murphy, N. C., is preparing to open a new talc mine near Regal on a 38-acre tract of land. Mr. Travis has been prominent in the talc industry for years.

Concrete Pavement Yardage

AWARDS of concrete pavement for January, 1937, were announced by the Portland Cement Association as follows:

Type of Construction	Sq. yd. awarded during January, 1937
Roads	2,836,162
Streets	544,179
Alleys	4,647
	3,384,988

City Would Buy Plant

ROCKFORD, ILL., is considering purchase of the quarry, crushing plant, office and equipment of the Northern Illinois Supply Co., defunct.

Cold Glaze for Concrete Products

A PATENTED PRODUCT that may prove of great interest and importance to builders, contractors and makers of building products has been secured by a Montreal, Que., resident, Lewis Rhodes, with sole manufacturing rights for Canada and the United States.

This is a new process in the treatment of concrete which represents a distinct advance on anything that has been previously accomplished, it is claimed.

"Glaze-Raise" tool finish concrete, as the discovery is called has many virtues. First of all it is extremely cheap to produce, as it only requires the machinery used for making ordinary concrete. Its wearing qualities are said to be almost indestructible, as tests have been made in an electric furnace up to 2200 deg. F.; also further tests at extremely low temperatures fail to crack, craze or otherwise affect the finish. Extreme tests not likely to happen in ordinary use have been made such as applying sulphuric acid, and in all instances the finish has been successful in retaining its original appearance.

There is claimed to be no limit to the artistic designs and range of colors both plain and fancy that can be produced in this material. Bonnacord granite in jet black with its peculiar mottle and all marble designs can be reproduced in a manner that in many cases have baffled experts in an effort to distinguish between the real and imitation article.

"Glaze-Raise" is a process which puts a tool raised finish on the face of concrete which assumes a high luster as on plate glass or the highest quality of tile. It can be made also with a mat finish or sand-blast effect, or if required a combination of all three finishes, and the surprising part is that these finishes can be made in one operation only.

Statements such as the foregoing may leave the average man unmoved, but those who know anything about the building trade will realize that here is a notable achievement.

Ordinary glazed concrete with a plain face has been manufactured for some years but until now concrete with a tool raised finish and an absolute control of color designs both in combination and plain, has always presented a problem defying the best brains on the Research Board of the British Government and in private concerns connected with the development of new building products in Great Britain.

A few of the uses to which "Glaze-Raise" concrete can be put are as follows: entrance halls, bathrooms, theatres, schools, hospitals, laboratories, shop fronts, swimming pools, grave stones, signs, paneling, bathsides, table tops, stairwalling, fireplaces and hearths, etc. The material is claimed to be weatherproof, fireproof, crackproof, and washable.

Unlike ordinary tiling, "Glaze-Raise" concrete can be made in sheets up to 6 ft. in length, thereby saving considerably in the length of time taken to lay the material, also the finish can be applied to the faces of ordinary brick, "Beaver-board," steel, copper, asbestos and wood, etc.

The simplicity and cheapness of making the material can be realized when it is claimed that any inexperienced boy can, with a couple of hours instruction and supervision, prove proficient in the making of the material.

The "Glaze-Raise" Co. of London (which will have no connection with the American Company) holds contracts for the manufacture of its product sufficient to keep the plant producing at high pressure for a long period, one contract alone amounting to $350,000.

A plant that will be in full production can be organized within six weeks, it is claimed by Mr. Rhodes, as almost any building would be suitable provided it was free from the vibration of heavy traffic; and an architect expert in the manufacture of the product has been commissioned to supervise all productive operations.

Standard Machinery Installations

STEARNS MANUFACTURING CO., Adrian, Mich., reports the recent sale of three power strippers in Detroit plants, for the manufacture of standard 8x8x16 in. units. These machines were installed at the plants of the Square Deal Block Co., Martin Berger Cement Block Manufacturing Co. and William Moors.

Appeal Denied

SUPERIOR SAND CO., Columbus, Ohio, was recently denied an appeal asking increased damage compensation by the Muskingum Conservancy's Districts appraisal board because of railroad relocations which increased the hauling distance from the company's pits to its plant.

Buys Tugboat

GALLAGHER SAND AND GRAVEL CO., New York, N. Y., has purchased the Navy tugboat "Chemung" at a cost of $15,638.15.

State Lime Plant

RANDOLPH COUNTY, W. Va., has been recommended as the best location for the proposed state prison lime plant. State agronomists say that the demand for agricultural lime would require a production of more than 200 tons per day.

STUBBORN

BINS *and* HOPPERS

Will Flow Freely

If You Equip Them With the Right Size

SYNTRON

PULSATING ELECTRO-MAGNET

VIBRATORS

Write for New Complete 1937 Catalogue Also Containing Information on Our

VIBRATORY FEEDERS
WEIGH FEEDERS
EXTERNAL CONCRETE FORM VIBRATORS

SYNTRON CO
450 Lexington Av., Pittsburgh, Penna.

MOLDS
For every purpose.
Send for Catalogue.
Artisan Mold Works
ELKHART, IND.

SPRAY CONCRETE
BLOCKS—VAULTS—WALLS
Ornamental Casts, etc.
with ADJUSTABLE CEMENT SPRAY
$15.00 and $17.00
Eureka Art Stone Works
Box 602, Eureka, Calif.

SPECIAL AGGREGATES

SPARKLING MARBLE
SPARKLING GRANITE
All colors—all sizes
TAMMS SILICA COMPANY
228 North La Salle Street Chicago, Illinois

CEMENT COLORS

CEMENT COLORS
Will not fade—extra fine and strong
TAMMS SILICA COMPANY
228 North La Salle St. Chicago, Illinois

STAR and ANCHOR COLORS
Geo. S. Mepham Corp., East St. Louis, Ill.
C. K. Williams and Co., Easton, Penn.

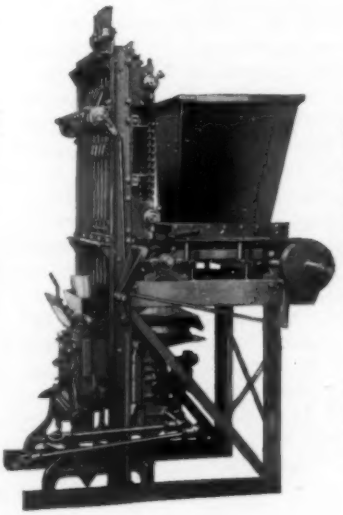
Leadership for 35 Years

A Multiplex Product in Your Plant Means Success

Flue Block machines
Double Hand Strippers
Single Hand Strippers
Building Tile Machines
Random Ashlar machines
Power Press Strippers
Power Tampers, Automatic or semi-automatic
Face Down machines
Stripper machines
Block cars, racks, trucks, conveyors, pallets, mixers
Complete plants installed

We can furnish light weight units in all sizes. True units assured.

The Multiplex Concrete Machinery Co.
ELMORE OHIO



Miles CONCRETE EQUIPMENT

The 1937 Models are ready

Are You Ready for the BIG year that is coming?

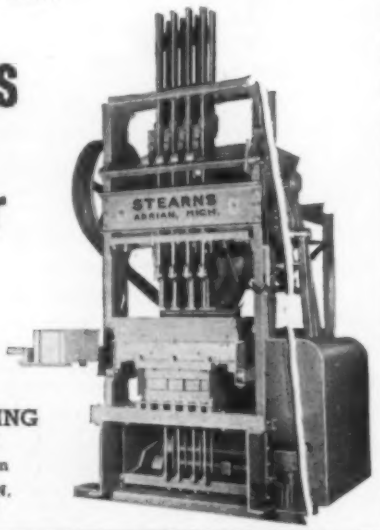
Get set for 1937. Write for catalog giving you all the information on the latest models —higher production than ever at no additional cost. Investigate before you buy.

THE MILES MANUFACTURING CO.
Dept. M JACKSON, MICHIGAN

There's money in concrete blocks

Stearns power equipment makes them of high quality at minimum labor cost. Necessary initial investment is the lowest required by any machine of equal capacity per man.

STEARNS Power Stripper



STEARNS MANUFACTURING COMPANY
Adrian, Michigan
EUGENE F. OLSEN, General Manager

"COMMERCIAL" CORED PALLETS SAVE DOLLARS

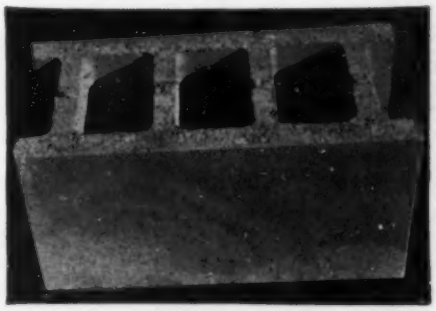
They produce better blocks—more uniformly cured because of the free circulation of the curing atmosphere through core openings.

"Commercial" Cored Pallets are lighter in weight—they permit of easier and better production of ashlar units as well as of header blocks. "Commercial Cored Pallets reduce breakage—cut maintenance cost—assure a lower investment.

Commercial Concrete Block Pallets Protect Profits. Write for full details.

The **COMMERCIAL SHEARING & STAMPING CO.**
YOUNGSTOWN, OHIO

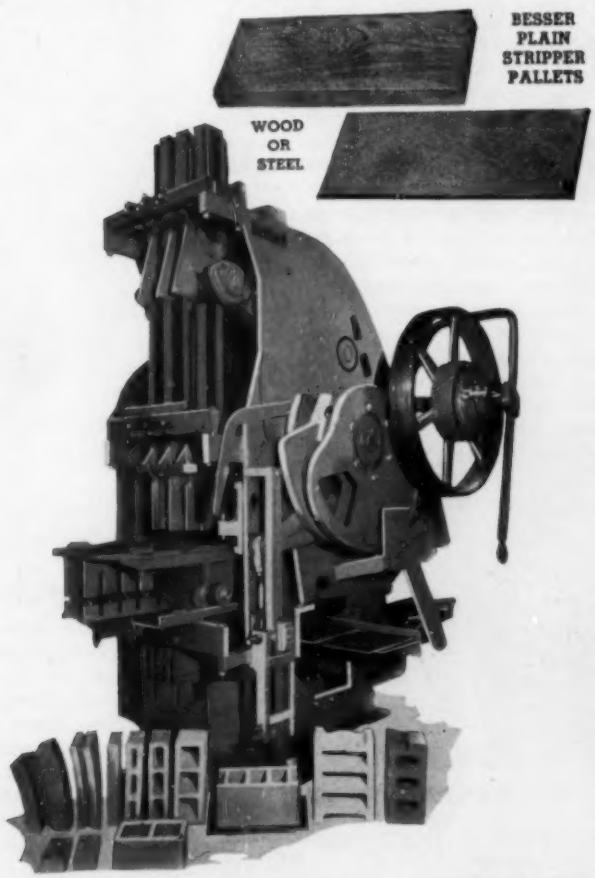
ATTRACTIVE PROFITS



Make The New Concrete Masonry Units With FULLY PRESSED TOP

New and bigger markets have been opened up by these superior quality units which are made exclusively on the new Besser Plain Pallet Strippers. These new units have faces, edges and corners as true and even as cut stone. Their high perfection has set a new standard of quality. They are in demand in high class construction where concrete masonry units were heretofore considered not good enough in appearance or not smooth and even enough to finish economically. The new Besser Nine Bar Tampers also give these units more even density and more uniform strength in both walls and webs than any units ever before made. The new Besser machines have been further simplified and the new units cost even less to make.

The Besser Plain Pallet Stripper is the only block machine that makes all units—regardless of size or shape—on *one set of plain pallets.* This means a saving in pallet cost in the average size plant amounting to from one to three times the cost of the machine itself. Additional economies in handling pallets and units plus automatic offbearing still further reduce operating cost.



BESSER PLAIN PALLET STRIPPERS

FULLY AUTOMATIC—3 Models—Capacities: 2000 to 4000 units per day.
SEMI-AUTOMATIC—4 Models—Capacities: 1000 to 2000 units per day.
POWER OPERATED with
Hand Controls—2 Models—Capacities: 500 to 1000 units per day.
MULTI-MOLD
Hand Operated—Capacity: up to 300 units per day. For manhole blocks, slabs and small cored units.
AUTOMATIC BRICK MACHINES—Capacities from 10,000 to 50,000 units per day. For brick, slabs, coal cubes and other small units.

EVERY CONCRETE PRODUCTS PLANT NEEDS A BESSER PLAIN PALLET STRIPPER

BESSER MANUFACTURING CO.

COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS

Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL, HOBBS, UNIVERSAL, PORTLAND

203 37TH STREET ALPENA, MICHIGAN

Ask For The New Besser Plain Pallet Stripper Catalog

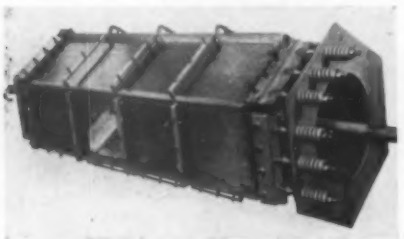
You Can Make BETTER Blocks, FASTER and for LESS COST On A BESSER PLAIN PALLET STRIPPER

New Machinery and Equipment

Trommel Screen

Heller Screen Co., Los Angeles, Calif., is marketing a new hexagonal screen designed for either dry or wet screening and close classification work. The screen is driven either on trunions or a center shaft turning from 5 to 8 revolutions per minute. Features are the method of pre-tensioning the wire and a zone of no vibration near the tail anchor plate to prevent crystallization due to vibration.

When used in a wet operation, water is supplied into the approaching side of the trommel as it turns, and a second pipe is placed on top of the trommel over the prickers to force the material which is clinging to the wires back into the screen. The prickers are so placed that as the trommel turns, each wire is depressed just enough to release



New hexagonal screen

any material which may have remained in the meshes, allowing it to fall back into the trommel.

The screens are manufactured in two types. In the first type, the decks are made 24-in. long and placed on the trommel in sections so that in a 3-section trommel, 3 different sized decks may be used. In the second type, the decks are made the full length of the trommel openings and dividers are used every 14 in. with a special lock plate to hold the screen wires in accurate mesh. Great savings in operation and in replacements are claimed for the screens.

Convertible Shovel

The Oscoop Co., Marion, Ohio, has announced its new "Invader" heavy duty ⅜ cu. yd. full revolving chain crowd shovel which is fully revolving and convertible to dragline, clamshell, crane, backhoe or skimmer service. This machine may be mounted either upon continuous tread crawlers or a commercial truck chassis. Travel speeds range from 1 to 4 miles per hour and the rotating speed is about 6 r.p.m. This machine is powered with a 6-cyl. heavy duty gasoline engine, Diesel engine or electric motor.

The "Invader" has independent swing and travel motions; chain crowd self adjusting to all boom angles; A-frame and machinery deck of alloy steel each cast in one piece; friction steering and digging locks controlled from the upper deck at the operator's position; crowd brake; line boom hoist; power dipper trip; and other features.

Heavy-duty ⅜-yd. convertible shovel

Drill Sharpening Furnace

The Philadelphia Drying Machinery Co., Philadelphia, Penn., has on the market a new slot type drill sharpening furnace, adaptable for use in end heating various lengths of bars where a sharp flame cut-off is desired. The furnace is particularly suited for forging, drill sharpening, tool dressing and heat-treating. It is available in various sizes with one or two burners, oil or gas serving as fuel.

Revolving feed distributor

Improved Revolving Feed Distributor

The Deister Concentrator Co., Fort Wayne, Ind., announces revisions and improvements to its "Concenco" revolving feed distributor, a device designed to split the feed of liquid or a mixture of solids and liquids, sluiced to the cone portion of the feeder, into any desired number of fractions from 1 to 10.

The design of the feed distributor incorporates a channel iron frame and trestle, mounting the splitting tank, the revolving cone and the gear head motor to make a compact unit.

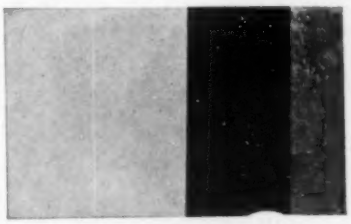
The unit may be set on a floor above the receiving equipment and the base bolted to the floor at each corner, or four upright angles may be bolted to the inside corners of the main frame and the entire unit suspended from the roof beams of the plant.

Slot type forge furnace

The heavy main shaft through the revolving cone is equipped with sealed anti-friction bearings for smooth, quiet operation. A 1/3-hp. General Electric gear head motor powers the unit. Recent installations include a unit for the distribution of feed to six diagonal-deck Deister-Overstrom tables handling glass sand in a new Southwestern plant and five units for feed distribution to 34 similar tables in a large phosphate plant.

Rubberizing Compound

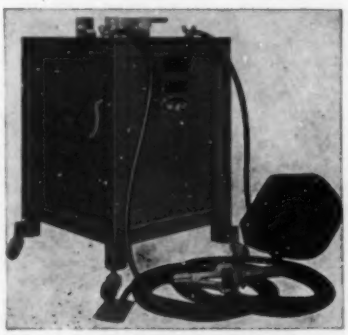
SELF-VULCANIZING RUBBER CO., Chicago, Ill., has just perfected the "Selfvulc Insulator", a rubber compound which incorporates the quality of a primer with a self-curing, cold-curing rubber, which can be applied by unskilled labor by dipping, spraying or by hand brushing. This product is claimed to make a steadfast bond in one application, but repeat coats to any desired thickness may be added. There is said to be practically no shrinkage in application.



Self-curing rubber compound

Light-weight Welders

THE MILLER MANUFACTURING CO., Appleton, Wis., has brought out a lighter weight, low priced transformer type welder under the trade name "Miller Standard Arc," in four models of capacities from 130 to 300 amperes. The cabinet is of wood and is said to be safe for operating on grounded surfaces, because they are of the "auto" transformer type. Prices range from $90 to $220 according to the model.



Transformer type welder

Electrostatic precipitator for cleaning air

Dust Precipitator

PANGBORN CORP., Hagerstown, Md., announces a new electrostatic precipitator for general industrial air cleaning use which is said to have an operating efficiency as high as 99% by weight. The unit is particularly suitable for salvaging valuable dust, mass air cleaning or removing objectionable particles from gas or vapor and similar applications. The complete unit consists of collector cells, ionizing assembly and power pack. Particles as small as 1/5 micron in size may be removed by the unit, according to the manufacturer.

New Welding Electrode

LINCOLN ELECTRIC CO., Cleveland, Ohio, announces the new "Shield-Arc 100," which is claimed to make welds with tensile strengths of approximately 100,000 p.s.i. This electrode is designed for welding steels having higher than ordinary ultimate strengths. "Shield Arc 100" electrode is said to be suitable for flat, vertical and overhead welding and is available in 1/8-, 5/32- and 3/16-in. sizes. The two smaller sizes are to be preferred for vertical and overhead welding, while the 3/16-in. size is also recommended for making vertical welds in thick plate.

Aluminum Shunt

E. I. DU PONT DE NEMOURS AND CO., Wilmington, Del., has recently developed a new shunt for short-circuiting electric blasting cap wires. It consists of a piece of aluminum foil about 2½ in. long which is wrapped around the bare ends of the wires, covering the wires and a portion of the insulation to eliminate the possibility of any current reaching the bridge wire.

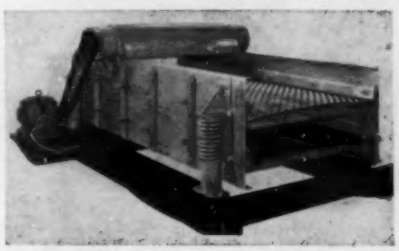
Pneumatic Rock Breaker

THE ATLANTIC STEEL CO., New York, N. Y., has placed on the market a tool used for breaking large sized chunks of stone or boulders in quarries or gravel pits. The tool was developed to eliminate the trouble and expense involved in secondary breakage. It is available in three sizes, the top of the taper of the tool being in the 2-in., 2¼-in., and 2½-in. sizes. The size of the hexagon shank is furnished in two sizes, either 1⅛- or 1¼-in. According to the manufacturers, the chief advantage of the breaker tool is that there is no maintenance cost and no re-sharpening is required. The tool is made of "Atsco" steel, the manufacturers of which also produce a complete line of drill steel, tool steel and other special alloy steels.

Tool for economical breaking of boulders

Horizontal Screen

ROBINS CONVEYING BELT CO., New York, N. Y., has introduced a new horizontal screen which is said to have extraordinary sizing efficiency produced by counterflow elliptical action which turns the material over and over as it passes over the screen, giving it more opportunity to pass through the mesh. This new elliptical stroke screen is said to have large capacity with low power consumption, and to combine features of simple construction, spring tensioned screen cloth, insulated vibration and small space requirement. It is offered in all standard sizes of single, double and triple-deck models and can be floor-mounted or suspended.



Horizontal screen with elliptical stroke

Dependable

Actual results on the job—day after day—are what count. Frequent and unexpected wire rope failures not only slow down production, but they also increase operating expense.

You can depend on "HERCULES" (Red-Strand) Wire Rope to handle, *consistently*, a large yardage for each dollar of its cost. There are definite reasons why this is so, and they involve materials, manufacturing experience, equipment and methods.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

Established 1857

5909 Kennerly Avenue, St. Louis, Mo.

New York — Chicago — Denver
San Francisco — Portland — Seattle

BACON FARREL CRUSHERS

Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

EARLE C. BACON, Inc.
17 John Street New York, N. Y.

THE INDUSTRY

New Incorporations

Terre Haute Gravel Co., Terre Haute, Ind., has increased its capital stock to 2000 shares of $100 par value.

Douds Quarries, Inc., Des Moines, Iowa; capital stock, $50,000. Incorporators are Grover C. Hubbell and H. E. Miller.

Long Valley Ore Co., Inc., Norwood, N. Y.; mining, quarrying; 1000 shares, no par value; Miller B. Moran, Lowville, N. Y.

Superior Cinder Block Co., Wilmington, Del., 250 shares. Incorporators are James T. Mullin, M. B. Collings and M. B. F. Hawkins.

The Fayette Gravel Co., Fayetteville, Texas; capital stock, $10,000. Incorporators are T. J. Palm, W. D. Eastland and J. W. Harrington.

Pensacola Marble & Granite Co., Pensacola, Fla.; 50 shares, $100 par value. Incorporators are A. E. Forster, J. D. Cain and C. H. Hoffman.

American Mica Products Co., 313 W. Chestnut St., Chicago, Ill.; 25 shares, p. v. common. Incorporators are W. H. Theel, J. G. Howard and W. Theel.

Continental Concrete Pipe Co., 33 N. La Salle St., Chicago, Ill.; 1000 shares, p. v. common. Incorporators are G. H. Hartong, M. Barnes and E. Holmberg.

Everlast Stone and Slate Corp., Oklahoma City, Okla., has been incorporated with capital stock of $10,000. Incorporators are M. E. Herring, Gordon T. Schaul and U. S. Schaul.

The Monmouth Stone Co., 83 East Side Sq., Monmouth, Ill., to deal in sand and gravel, crushed rock, etc.; 200 shares, p.v. common. Incorporators are G. D. Kistler, F. E. Kissinger, and I. Kistler.

Cartersville Barium Co., Inc., Bartow County, Ga.; capital stock, 300 shares common stock, no par value; subscribed, $1000. Incorporators are L. A. Wood and Albert W. Wood, Monroe County, Tenn.

Butler Feldspar Co., Spruce Pine, N. C.; authorized capital stock, $10,000; subscribed, $500. Incorporators are R. U. Butler of Elizabethton, Tenn., J. A. Heaton of Spruce Pine and E. M. Grindstall of Senia.

Oklahoma Marble Quarries Corp., Marble City, Okla.; capital stock $500,000. Incorporators are B. D. Bensing, Carthage, Mo., L. A. Corlis, Joplin, Mo., and G. W. Taylor, Oklahoma City, Okla.

Pure Lime Corp., incorporated in Delaware; to deal in lime, limestone, oyster shells and other shells; $50,000 and 2000 shares. Incorporators are Arthur M. Kreidmann, J. A. Hayes and I. A. Fenwick, New York, N. Y.

Non-Metallic Minerals Corp., Micaville, N. C.; to mine, produce, buy and sell all kinds of non-metallic minerals; authorized capital stock $140,000, subscribed stock $600. Incorporators are Walter E. Laughridge, A. N. Fuller and Walter G. Pippin, all of Spruce Pine, N. C.

Personals

A. Acton Hall, Jr., vice-president of Ohio Stone Products Co., Piqua, Ohio, was married to Mrs. Gladys T. Orr February 6.

Wallace E. Wing, heretofore superintendent of the South Chicago, Ill., plant of Marblehead Lime Co., has been made chemical engineer in charge of the company's technical and engineering problems. **Thomas H. Palmer** succeeds Mr. Wing as superintendent at South Chicago, and **William A. Lauber** of the Kansas City office has been transferred to Chicago to succeed Mr. Palmer as purchasing agent and safety director.

Obituaries

George Brew, president of the Waukesha Washed Sand and Gravel Co., Waukesha, Wis., died January 31.

Willis Dearinger, manager of the gravel pit west of Elmwood, Ill., died February 2.

Michael F. O'Malley, 59, manager of the Gypsum Products Corp., Seattle, Wash., died February 15, following a brief illness and operation.

George A. Mattison, 78, president of Wood-Slag Corp., Birmingham, Ala., died Februstock Slag Corp., Birmingham, Ala., died February 6.

Donald M. McNeale, for a number of years secretary-treasurer of the Smoot Sand and Gravel Corp., Washington, D. C., died suddenly at Miami, Fla., February 13.

Daniel A. Fogg, 60, one of the partners in the Columbian Granite Co., Barre, Vt., died February 10 at his home in Montpelier after an illness of a year and a half.

H. C. Perry, owner of the Stringtown Crushed Rock plant, Stringtown, Okla., and vice-presiden. and treasurer of the Southwest Stone Co., Dallas, Tex., died January 28.

Joseph Ladrie, head of the granite firm of Hebert and Ladrie, Barre, Vt., died January 29 from a throat infection. Mr. Ladrie had been in poor health for some time.

Robert W. Gotshall, 54, general sales representative for Caterpillar Tractor Co. and pioneer in the development of the track-type tractor and road machinery industries, died in Peoria, Ill., February 11, after an illness of six months.

Donald W. Howe, 35, a civil engineer in the employ of the Portland Cement Company in Manhattan, N. Y., since 1933, was found dead February 15 in the garage behind his home at Pleasantville, N. Y. The case is listed as a suicide, and death was caused by carbon monoxide fumes.

Lee O. Eslinger, 48, died at his home in Winterset, Iowa, of lobar pneumonia February 4. He was foreman of the Winterset Limestone Co. quarry east of town since 1936. Before that he was employed by the Pennsylvania-Dixie Cement Corp. as foreman at the Gilmore City quarry.

Charles W. Babcock, 80, of Kasota, Minn., died January 31, at Long Beach, Calif., where he was spending the winter. He was a pioneer in developing the Kasota stone quarries and was one of the owners of the Babcock & Wilcox stone quarries. Kasota stone is widely known and has been used in structures such as the Minnesota state capitol, the Los Angeles city hall, and the Harvard Medical school building.

Central

Lisbon, Ohio: Operations recently began at the Smallwood Stone Quarry.

Gilmore City, Iowa: The stone quarry north of Gilmore City has been opened under WPA.

Toronto, Iowa:. Concrete Materials Co., Waterloo, Iowa, is crushing rock at the Dienst quarry.

Coventry, N. Y.: Jobs for 84 men will be provided in a quarry, authorized at a cost of $30,452.

Fort Scott, Kan.: WPA workers are to be kept busy in inclement weather in a quarry at the west edge of town.

Sturgeon, Mo.:. A WPA worker was injured at a rock crushing project while drilling through a rock.

Frederika, Iowa: Work at the Bremer county rock quarry has been shut down for lack of funds.

Anadarko, Okla.: The Caddo county stone quarry project operated under WPA has been discontinued.

Waterloo, Iowa: The county purchased an air compressor for $2000 for use in quarry work.

Princeton, Mo.: Mercer county is planning to resume the crushing of limestone for use on farms locally.

Vibbard, Mo.: A rock crusher is being installed to crush stone for the new road, north of Vibbard.

Chanute, Kan.: The rock quarry that has been furnishing rock for the municipal airport project has been closed.

Otselic, N. Y.: The operation of a quarry and a stone crushing plant by WPA at a cost of $29,242 has been approved by WPA.

King City, Mo.: A new WPA quarry project is being opened under the sponsorship of the State Highway department.

Menomonee, Wis.: County labor will resume work in the Sherman quarry to get out agricultural stone.

Milestone, Mont.: The Milwaukee railroad began operations at its quarry to take out rock for rip-rapping.

Wykoff, Minn.: A work relief project adopted by Fillmore county will make agricultural limestone available to local farmers.

Lamoni, Iowa:. A double shift of men was put to work February 12 to work the county quarry.

West Branch, Iowa:. The Cedar Valley quarry project was opened by the WPA after several months idleness, to crush rock for roads.

St. George, Kan.: Quarrying of rock has commenced under WPA on the Dowe Tabler farm for surfacing of the Wheaton-Wamego road for a distance of 7 3-4 miles.

St. Louis, Mo.:. A WPA worker was rescued from a hopper into which he fell while working at St. Louis county quarry, after being buried more than an hour.

Davis City, Iowa: Two shifts have been placed at work at the rock quarry near Davis City to store rock for road surfacing and other construction.

Larned, Kan.:. A county-sponsored WPA rock quarrying project was started in February. Stone will be used as rip-rap to protect embankments of all county and state highway bridges and culverts.

Bethany, Mo.:. The city's winter relief job for Bethany laborers of removing 1000 yds. of rock from the city's quarry has been completed. Stockpiles of rock have been placed at various points in the city for street work.

Maryville, Mo.: Nodaway county soil improvement association has leased a stone pulverizer for the rock quarry at Pumpkin Center. The pulverizer has a capacity of 7 tons of pulverized limestone per hour, which will be used by association members.

Sand and Gravel

Wabee Gravel Co., Milford, Ind., has been dissolved.

Eugene, Ore.: Eugene Sand and Gravel Co. has changed its name to M. and R. Properties Co.

Durham, N. C.: The city of Durham is planning to work several gravel pits for material to repair the city streets.

Bristow, Okla.: Gravel is being hauled from the county gravel pit near Iron Post for use on road projects.

Wapello, Iowa: The R. R. Hunt gravel pit in Jefferson township has been opened to provide work for unemployed men of the county.

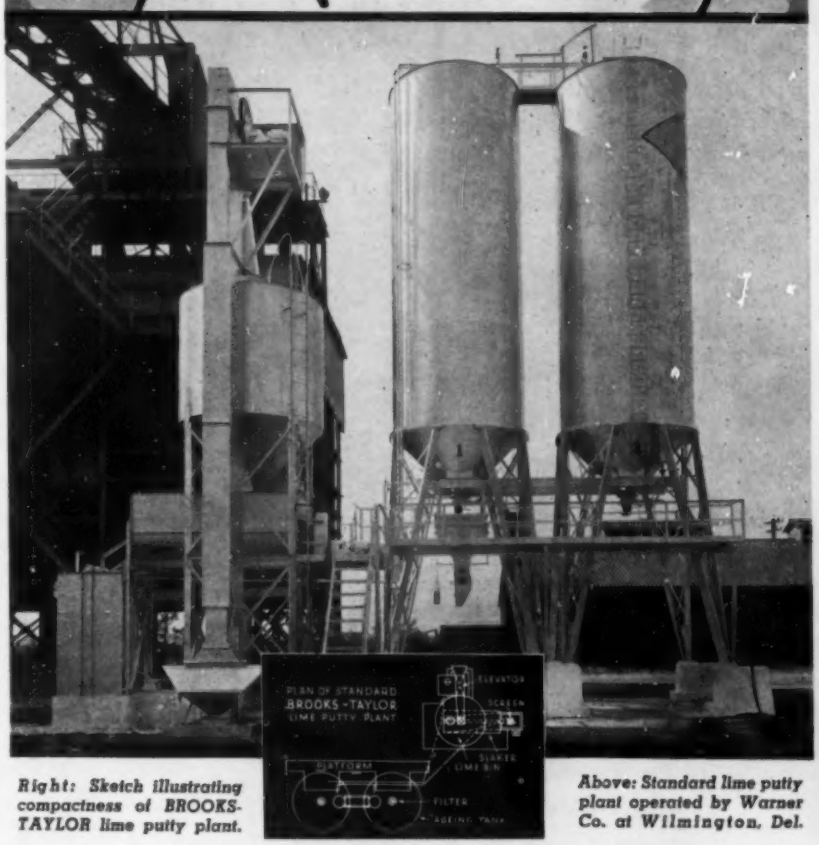
Elk City, Okla.: Screening tests have been run recently to determine the availability of a suitable supply of gravel for use in black-topping 40 blocks of city streets.

Manufacturers

Iron & Steel Products, Inc., Chicago, Ill., announces resignation of P. K. Freese.

Lincoln Electric Co., Cleveland, Ohio, has appointed N. B. Gilliland to the sales engineering staff of the Detroit office.

The BROOKS-TAYLOR METHOD OF PRODUCING *Aged Lime Putty*



Right: Sketch illustrating compactness of BROOKS-TAYLOR lime putty plant.

Above: Standard lime putty plant operated by Warner Co. at Wilmington, Del.

THE Brooks-Taylor Lime Putty Plant is a standard unit utilizing a patented process to prepare and handle *aged* lime putty.

Quick lime is slaked mechanically, screened and pumped into elevated storage tanks to age, during which process the excess water from the putty is carried off by a special type of filter.

When the putty has reached the proper consistency, the filter is closed. The aged putty can then be withdrawn from the tanks by gravity into a measuring batcher and dumped directly into mixer trucks for delivery. The proper amount of sand is added and mixed with the putty enroute.

The delay and inconvenience of slaking and ageing quick lime on construction jobs is eliminated—a thoroughly slaked, cool lime putty is produced—the cost of production is reduced—the process produces a highly workable mortar, plaster and stucco—the covering capacity of plaster and finish coats is increased—brick mortar droppings are reduced—the builder is provided with a ready-mixed putty service.

Write our nearest office for information on the process or a quotation on a plant to meet your requirements.

CHICAGO BRIDGE & IRON COMPANY

Plants at BIRMINGHAM, CHICAGO and GREENVILLE, PA.

Chicago..2452 Old Colony Bldg.
New York...3396-165 Broadway
Cleveland..2285 Rockefeller Bldg.
Detroit....1553 LaFayette Bldg.
Dallas...1487 Dallas Ath. Club
Birmingham..1505 N. 50th Street
Tulsa.....1650 Hunt Bldg.
Houston.....2919 Main Street
Philadelphia.1651-1700 Walnut St.
Boston...1564 Consol. Gas Bldg.
San Francisco..1093 Rialto Bldg.
Los Angeles..1458 Wm. Fox Bldg.

The Loader to Buy

. . . is a Haiss . . . for its transmission . . . for its feeding device . . . for its ease of operation . . . for the money you save on upkeep.

5 yds. a min.—or 3, 2 or 1½. Let us quote you on the size you need.

Write, Wire or Telephone

HAISS

George Haiss Mfg. Co., Inc., Park Ave. & 143rd St., New York

Who, for over 40 years, have created and sold none but equipment of demonstrable superiority in design and manufacture.

Portable Conveyors — Clamshell Buckets

SIMPLE RUGGED DEPENDABLE

CONSTRUCTION EQUIPMENT

STERLING QUALITY

EFFICIENT DESIGN

Sterling's Patented Construction permits use of efficiently designed impellers and pump cases. Compare the performance and efficiency obtained with the Sterling three blade streamlined open trash type impeller with those using impellers with many narrow blades and those with special volutes—made necessary by inferior self-priming design. For efficient self-priming design insist on Sterling.

ASK FOR LITERATURE TODAY

Sterling

MACHINERY CORPORATION

311-14 Southwest Blvd. Kansas City, Mo.

Pittsburgh Testing Laboratory, Pittsburgs, Penn., announces election of C. M. Houck, formerly manager of inspection, to the office of vice-president.

The Medart Co., St. Louis, Mo., has opened a district sales office in Kansas City, Mo., in Room 1559, Dierks Bldg. W. A Crooks is in charge.

John A. Roebling's Sons Co., Trenton, N. J., announces appointment of Arthur E. Gaynor as manager of the New York branch, succeeding W. P. Bowman, deceased.

Audubon Wire Cloth Corp., Philadelphia, Penn., has appointed W. S. Yates Associates, 520 N. Michigan Ave., Chicago, Ill., to handle its sales in the Chicago district.

American Chain & Cable Co., Inc., Bridgeport, Conn., has elected George C. Moon as a vice-president and director, with headquarters at 230 Park Ave., New York, N. Y.

New York Belting & Packing Co., Passaic, N. J., has appointed Biggs-Kurtz Hardware Co., Grand Junction, Colo., as distributor of its mechanical rubber goods line in that area.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has promoted Robert F. Vogt to chief consulting engineer, to succeed the late J. F. Max Patitz. Mr. Vogt has been with the firm since 1907.

New York Belting and Packing Co., Passaic, N. J., has appointed Crerar, Adams & Co., 3550 S. Morgan St., Chicago, Ill., as distributor of its mechanical rubber goods line in the Chicago territory.

B. F. Goodrich Co., Akron, Ohio, has purchased the factory site and building at Cadillac, Mich., formerly occupied by Acme Motor Truck Co., and the property is being fitted for the manufacture of rubber goods.

Westinghouse Electric and Manufacturing Co. will move its Pittsburgh, Penn., office and some of its general offices now located at East Pittsburgh to the Union National Bank Building in Pittsburgh about May 1.

Link-Belt Co., Chicago, Ill., announces appointment of James Robertson Co., Ltd., as exclusive distributor of its automatic coal burners in Canada. The Robertson organization has offices in Montreal, Toronto, St. John, Winnipeg and Saskatoon.

Geo. P. Reintjes Co., Kansas City, Mo., announces appointment of J. R. Goodwin of Dunbar Engineering Co., 103 Park Ave., New York, N. Y., as its representative for the sale of sectionally supported walls and arches in New York City.

The Wellman Engineering Co., Cleveland, Ohio, following its annual meeting February 16, announces election of Alfred E. Gibson as president, succeeding George W. Burrell, who becomes chairman of the board. Announcement is also made of the appointment of J. Harry Warriner as works manager.

Universal Crusher Co., Cedar Rapids, Iowa, announces election of A. W. Daniels as president and H. F. Rikhoff as secretary and treasurer. Both men have previously been associated with American Manganese Steel Co. L. S. Hackney has been appointed sales manager and L. W. Dunlap assistant general manager.

The American Welding Society, New York, N. Y., has accepted a gold medal from J. F. Lincoln, president of Lincoln Electric Co., Cleveland, Ohio, to be presented to the author of the best paper on welding published in the Journal of The American Welding Society during the year October, 1936, to October, 1937.

Nordberg Manufacturing Co., Milwaukee, Wis., recently appointed the Brown-Bevis Equipment Co. of Los Angeles as its representative for the sale of Symons cone crushers in Southern California. The Nordberg company's office in the Subway Terminal Bldg., Los Angeles, will continue to handle all other West Coast business.

Blaw-Knox Co., Pittsburgh, Penn., announces election of H. B. Loxterman as a vice-president and Albert L. Cuff as secretary. W. H. Eisenbeis has been made vice-president of Union Steel Casting Co., with John Baker as sales manager. P. M. Fleming has been named vice-president and a director of Pittsburgh Rolls Corp.

Lincoln Electric Co., Cleveland, Ohio, has moved its Cincinnati, Ohio, office from 5th and Baymiller Sts. to Room 602, American Building, Central Parkway at Walnut St., as a result of recent flood conditions. B. J. Brugge and W. R. Smith have been appointed to the sales staff of Lincoln's Los Angeles office, and Robert A. Wilson, George Mandula and A. T. Cox, Jr., have been appointed to the sales staff of the Chicago office.

Trade Literature

The following literature was recently released and is obtainable, free, on request to the respective sponsor:

Belt Conveyor Machinery. Section 103 of General Catalog 100, a 100-page book, catalogs and illustrates back stops, couplings, shaftings, idlers, trippers, etc. PALMER-BEE CO., Detroit, Mich.

Crushing Equipment. The covers of Catalog 1655 are printed in very beautiful colors. The 24-page book describes road-making, earth-handling, rock-crushing and street-cleaning equipment. AUSTIN-WESTERN

Contractors' Equipment. Condensed catalog No. 37, 12 pages, gives capacities and specifications for various kinds of pumps, hoists, saw rigs and generating plants. Price list is appended. STERLING MACHINERY CORP., Kansas City, Mo.

Mechanical Rubber Goods. Catalog 36 gathers, in 96 pages, useful data regarding belt speeds, horsepower correction factor, typical conveyor layouts, packings, rings, discs, etc. NEW YORK BELTING & PACKING CO., Passaic, N. J.

Bulk Material Handling Machinery. Section 106 of General Catalog 100 is a 288-page book giving prices, specifications and illustrations of crushers, bucket elevators, flight and apron conveyors, revolving and vibrating screens, etc. PALMER-BEE CO., Detroit, Mich.

Nickel-Copper Alloy. "Strength Plus—Monel for Mechanical Jobs" is a 48-page book presenting an interesting resume of the applications of Monel where mechanical strength and chemical resistance are important. THE INTERNATIONAL NICKEL CO., INC., New York, N. Y.

Pumps. "Engineering Data and Prices, 1937" is a pocket-size, 256-page handbook for the solution of pumping problems. The first part is made up of sections dealing with various classes of pumps and is keyed to a thumb index at the front. The second part is devoted to engineering data such as specific and detailed information on the hydraulics of pumping. ECONOMY PUMPING MACHINERY CO., Chicago, Ill.

WORTHINGTON

EQUIPMENT FOR QUARRIES

STATIONARY COMPRESSORS
for permanent installation in operation of quarries and mills

PORTABLE COMPRESSORS
for preliminary work in opening up new quarries

DIESEL AND GAS ENGINES
for driving the crushing plant

WAGON DRILLS AND TRIPOD (DRIFTER) DRILLS
for snake holing and deep ledge work

ROCK HAMMERS
for boulder popping and shallow bench work

PUMPS
for all services

V-BELT DRIVES

WORTHINGTON PUMP AND MACHINERY CORPORATION

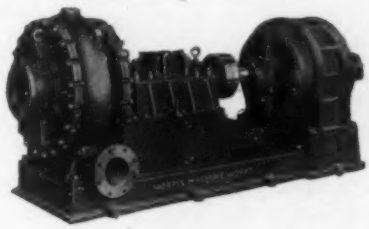
General Offices: HARRISON, NEW JERSEY
District Offices and Representatives in Principal Cities

The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users

Morris Dredge Communities . . . .

Where a number of sand and gravel producers are operating in adjacent deposits, it frequently happens that because of the wide preference for Morris Dredges, a Morris Dredge family group will be working close together, each dredge being separately owned by the various companies. One interesting Morris group of this kind is operating on the Kaw River in Kansas. Another instance is in Cleveland, Ohio, where six Morris Dredges, owned by different companies, are working within two miles of each other. The many reasons for this popularity of Morris Dredges are explained in a bulletin which every sand and gravel producer should have. Your copy awaits your request.



A Material Consideration . . . .

Morris has no "stock" pumps. Each Morris pumping unit is specially designed and built, not only for its individual operating conditions, but further, to include selection of metal and proportions of parts that will be correctly suited to the material to be pumped. Whether you wish to handle dense pulp, miscellaneous trash, or clear liquids, Morris can offer a design that has amply demonstrated long maintenance efficiency and low upkeep expense. Bulletins on any Morris Pump type will be sent on request.

Valuable but Not for Sale . . . .

The 73-year experience of the Morris Engineers can't be bought, but is offered free for the solution of any pumping problem. It makes Morris recommendations authoritative and it makes Morris designs handle their jobs effectively and efficiently. If you want to find out how it can be applied to your own pumping requirements, write to Morris Machine Works, Baldwinsville, New York.

For authoritative recommendations on any pumping or dredging problem, write to Morris Machine Works, Baldwinsville, N. Y.
Representatives in Principal Cities

KEEP THE JOB *moving* WITH BYERS

THE road crew, trucks, crusher . . . all depend on the shovel to keep them working. Progress of the entire job depends on the shovel. Thus, it is the key link in the chain of operations that *keep the job moving* to completion on schedule time and at satisfactory costs.

A SHOVEL doesn't dare to break down for, if it does, costs immediately soar. Thus trucks stand idle, men lean on their tools . . . get paid for waiting instead of working.

IF YOU want to keep the crusher busy, let a Byers shovel feed it. You can place a Byers on the job and forget it. Byers' record of dependable, continuous, and low cost performance on a wide variety of pit and quarry jobs is your assurance. Then, you can spend your time keeping the balance of the job progressing. Get up to date on Byers!

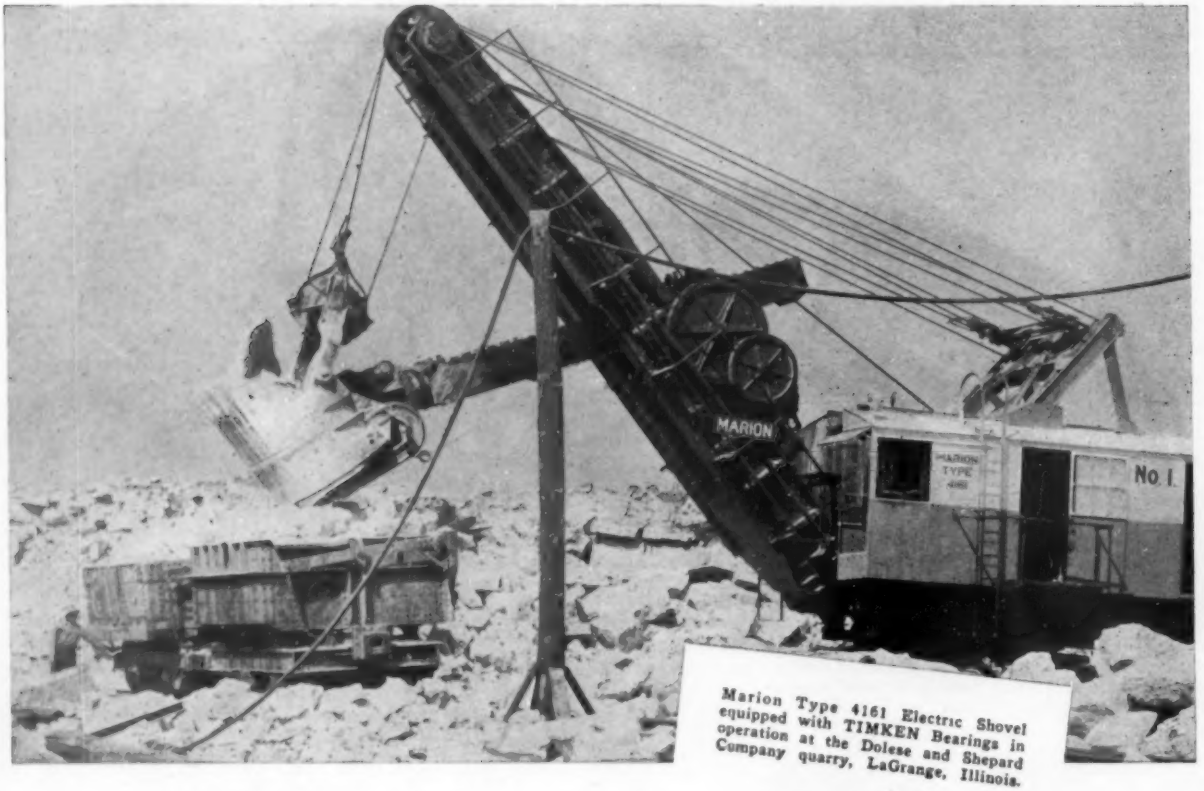
THE BYERS MACHINE CO.

Ravenna, Ohio

⅜ yd., ½ yd., ⅝ yd., ¾ yd., 1 yd., 1¼ yd. shovels and cranes

BYERS

For Better Operating and More Dependable Quarry Equipment



Marion Type 4161 Electric Shovel equipped with TIMKEN Bearings in operation at the Dolese and Shepard Company quarry, LaGrange, Illinois.

The bearings in your quarry equipment can make all the difference between high and low operating and maintenance costs.

You need bearings that can give your quarry cars, conveyors, power shovels, screens, crushers, compressors and other equipment full protection against all of the destructive forces that are constantly threatening its life — friction, wear, radial-thrust loads, shock and misalignment of moving parts.

TIMKEN Tapered Roller Bearings made of TIMKEN Alloy Steel have everything it takes to assure smooth operation, high speed, low power and lubricant consumption and long equipment life. You will find them in leading makes because equipment manufacturers have found that their use makes better machines—and *better selling* machines. Specify Timken-equipped.

THE GREEN DIAMOND. Illinois Central Railroad. Another crack Timken Equipped streamliner.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN

TAPERED ROLLER BEARINGS

"We put an end to crawler troubles when we got this new P&H Pacemaker. It's built for travel—proved for travel—in millions of miles of tractor service." Martin Lewein — shovel operator.

Here's how we get SHOCK ABSORBING ACTION *in these* TRACTOR-TYPE CRAWLERS

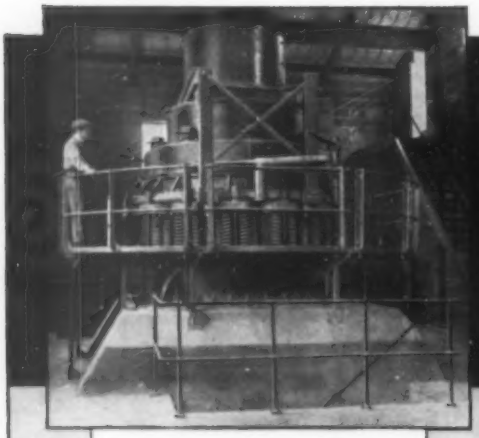
● The tractor-type crawlers on the P&H Pacemaker are always kept at proper tension by these compensator springs. There's no slack in the crawler track—none of that jerkiness to cause damage. At the same time, there's ample shock-absorbing action in the springs themselves to protect the crawlers against distortion or breakage. These compensator springs automatically adjust the crawler track for proper action on long or short hauls, in sand and gravel or knee deep in muck. Crawler troubles are a thing of the past on these P&H Pacemakers—one of the features that make them faster on the job.

HARNISCHFEGER CORPORATION
4465 W. National Avenue *Established 1884* Milwaukee, Wisconsin

Warehouses and Service Stations:
Hoboken — Memphis — Jacksonville — Dallas — Seattle — Los Angeles — San Francisco

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES P&H SERVICE HOISTS • MOTORS • ARC WELDERS



Seven-foot Standard Cone Crusher crushing limestone.

Four-foot Short Head making a very fine limestone product.

CRUSHING and SCREENING

you can depend on SYMONS

WHETHER it is for ordinary reduction crushing or for making the finer products as are in demand today, no piece of crushing equipment is comparable to the Symons Cone. With the two types, Standard and Short Head, any requirement for product or capacity can be met. The Symons Cone is the answer for plants whose reduction crushing equipment is obsolete and no longer capable of profitably producing the sizes required today.

The Symons Screen fills the same need in the field of screening. It sets level and with its different screening action, the problem of accurately sized materials is readily solved. When considering changes in either crushing or screening equipment, see what Nordberg has to offer.

NORDBERG MFG. CO.

MILWAUKEE, WISCONSIN

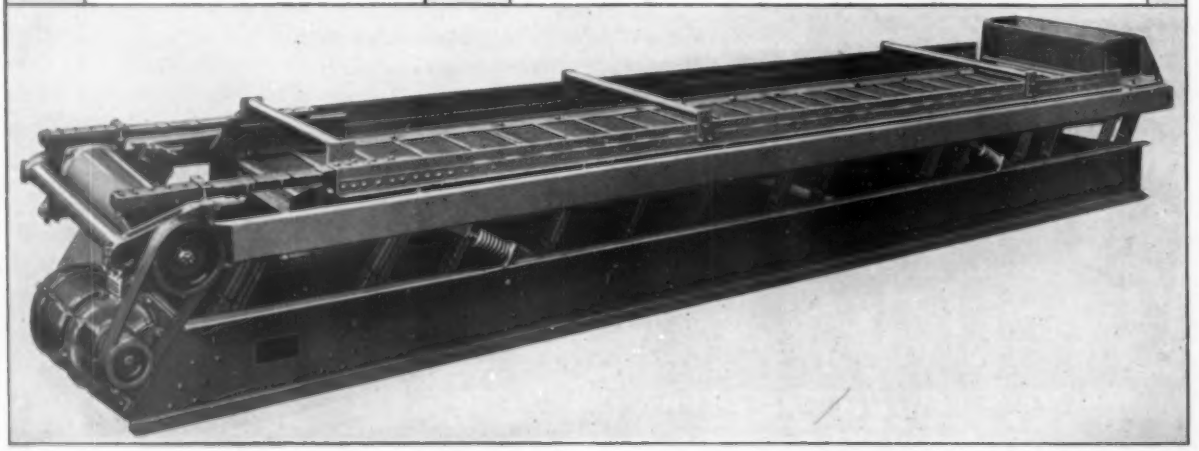
NEW YORK
60 E. 42nd St.

LOS ANGELES
846 Subway Term. Bldg.

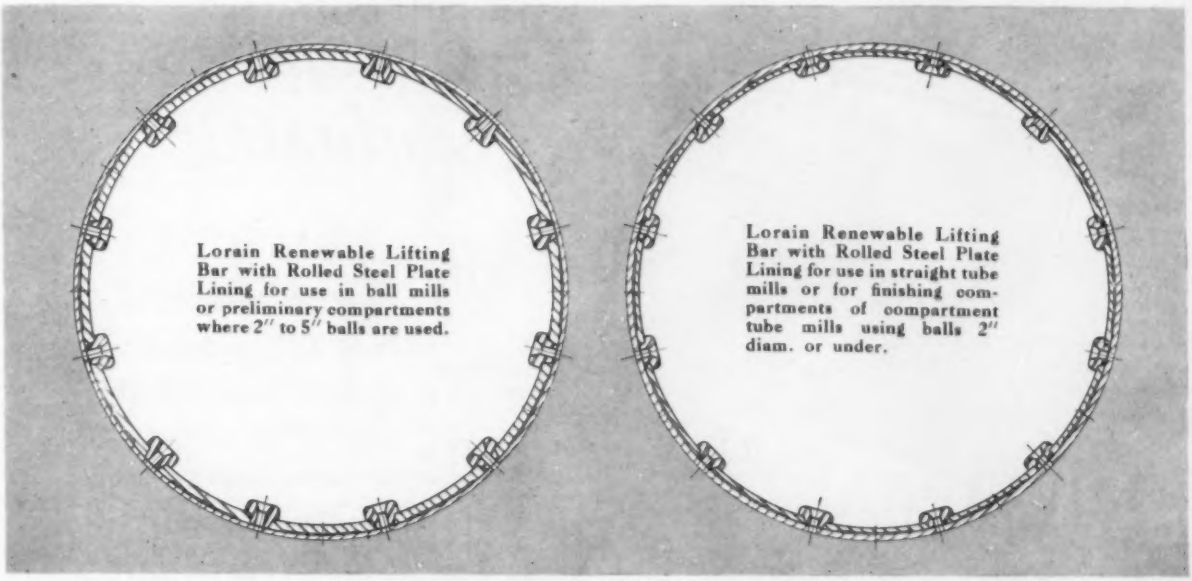
LONDON
Bush House

TORONTO
Concourse Bldg.

MEXICO CITY
Edificio Cook 413



This **NEW** *development* will reduce your Grinding Costs


Lorain Renewable Lifting Bar with Rolled Steel Plate Lining for use in ball mills or preliminary compartments where 2″ to 5″ balls are used.
Lorain Renewable Lifting Bar with Rolled Steel Plate Lining for use in straight tube mills or for finishing compartments of compartment tube mills using balls 2″ diam. or under.

NOTICE HOW the heat treated high carbon steel plate linings are chamfered to suit design of lifting bars. Wash against mill shell is thus reduced.

BOTH initial and operating costs of linings for ball, tube, and compartment tube mills, have been effectively reduced by the development of USS Lorain Rolled Steel Plate Lining.

Both the lifting bars and the plates are reversible, being completely symmetrical along the center line of each. Thus, both can be reversed in the tube mill, giving additional life for each. The lifting bar is comparable in grinding action to the present risers or lifts in cast metal linings. The lifts receive the greatest punishment in use and usually are worn well before the body section of the plate. With this new development, all lifting bars are in themselves renewable and can be replaced without discarding the body section, thus renewing the cascade action without replacing the complete lining.

There are no limitations to the rise of the lifting bar,—nor in the thickness of the rolled steel plate lining. Both can be adapted to the type of grind, size of grinding balls, and the size of the mill.

The new rolled steel plate lining does not pit or stretch in service, it actually polishes—indicating a surface more wear-resisting than any previously produced. Experiments have shown that this new steel lining does not coat under conditions where cast metal linings do.

USS Lorain Rolled Steel Linings are made to close dimensions, so that all fittings of plates and lifting bars are tight and firm. Therefore, with no clearance, there is almost no opportunity for wash of materials to grind against the shell of the mill.

This new development will reduce costs and increase profits in your own mill. The use of high carbon rolled steel plate considerably reduces weight, resulting in the need for less power to operate the mill. If you wish further information on the adaptation of this new product to your mill write to us. Give us the dimensions and type of your mill and we will gladly show you how USS Lorain Rolled Steel Plate Lining can be fitted to your grinding problems.

U·S·S LORAIN ROLLED STEEL PLATE LINING

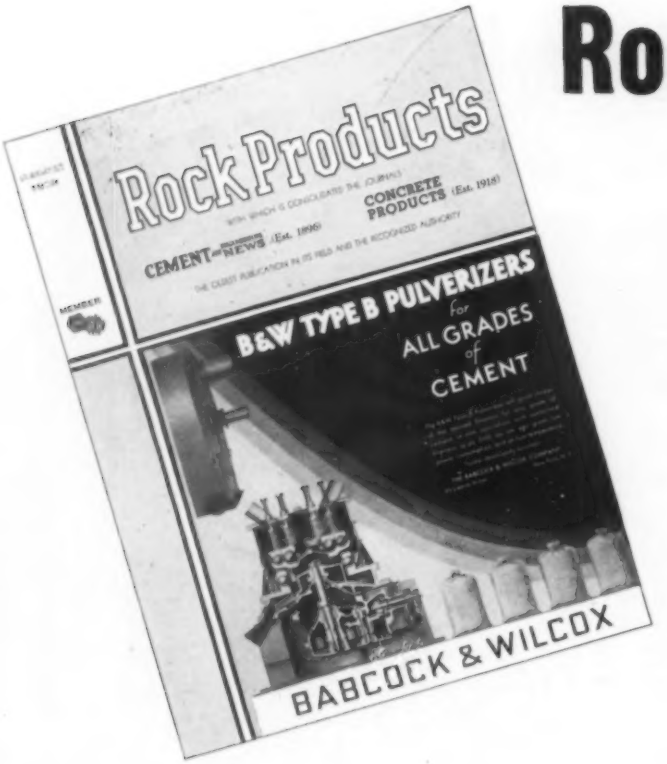
CARNEGIE-ILLINOIS STEEL CORPORATION

Lorain Division *Johnstown, Pa.*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



Rock Products

Leads in a Prosperous Industry

▲

ROCK PRODUCTS is FIRST in Editorial Achievement — Quality Circulation — Quantity of Advertising — Purchasing Power.

▼

MARKET

Ending the year 1936 with a rush of business, the rock products industry anticipates substantial increases on a sound basis in 1937. A 60% increase in volume of private work over publicly financed contracts in 1936 shows that producers and manufacturers in this industry are no longer entirely dependent on publicly financed work. This clearly points out that private industries have gained confidence and marks a rapid return to normal processes in construction.

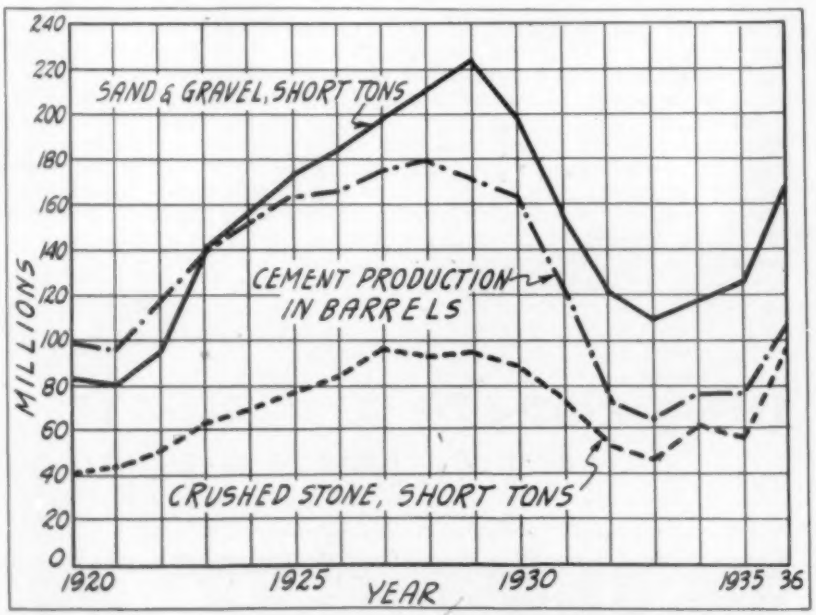
Present conditions warrant the conservative estimate of 6½ billion dollar volume of construction in 1937. It may even reach higher—some authorities predict a possibility of reaching 75% of the normal volume of 10 billion dollars in 1937.

For 1936, the volume of sand and gravel shipped was 75% of the peak tonnage in 1929, crushed stone tonnage was 96% of its peak and portland cement shipments were up 46%—bearing out this prediction.

Authorities forecast that industrial building construction will increase 60% in 1937; that public utilities construction will be up 50% and that a 40% increase in residential construction is to be expected.

Producers and manufacturers of sand, gravel, crushed stone, lime, cement, etc., are modernizing to meet great demands on their facilities. Obsolete equipment must go, plants must be enlarged and a new interest in cost-cutting machinery is being displayed.

ROCK PRODUCTS plants are substantial. The necessarily huge investments in mechanical set-up attract substantial men, and shut out the inadequately financed. These men head the plants of a basic industry on which other basic industries are dependent. These are railroads, highway building, the steel industry, general building and contracting,



This chart shows a sharp upturn in business in 1936

chemical industry, and the glass and paint industries, and other users of cement, lime, soapstone, glass sand, sand-lime brick, slag, and other non-metallic minerals which the rock products industry produces.

The annual investment for electrical equipment in the crushed stone industry is between $6,000,000 and $7,000,000; in the sand and gravel industry over $9,000,000; in the lime industry close to $1,500,000 with approximately $11,000,000 invested in the miscellaneous divisions of the non-metallic minerals industries.

There are about 3,000 primary crushers in use and between 6,000 and 7,000 secondary crushers.

The industry uses approximately 4,000 grinding mills and almost 30,000 belt conveyors equipped with more than 6,000,000 feet of belting; there are about 8,000 vibrating screens and almost 5,000 revolving screens. These require about 2,430,000 sq. ft. of screen, cloth or plate.

Approximately 7,000 motor trucks are used for hauling. Upward of 2,500 power shovels are required. Other equipment includes 2,000 rotary kilns, coolers and dryers; dust collecting systems; thousands of speed reducers; also gasoline and Diesel engines — jackhammers — locomotives—pumps—excavators—washers—classifiers — welding equipment — quarry cars — fans—bins—buckets—chute liners—air compressors—air filters—loaders—mixers —storage systems—chain—wire rope—drill steel—grease—oil—and thousands of pieces of other equipment and accessories.

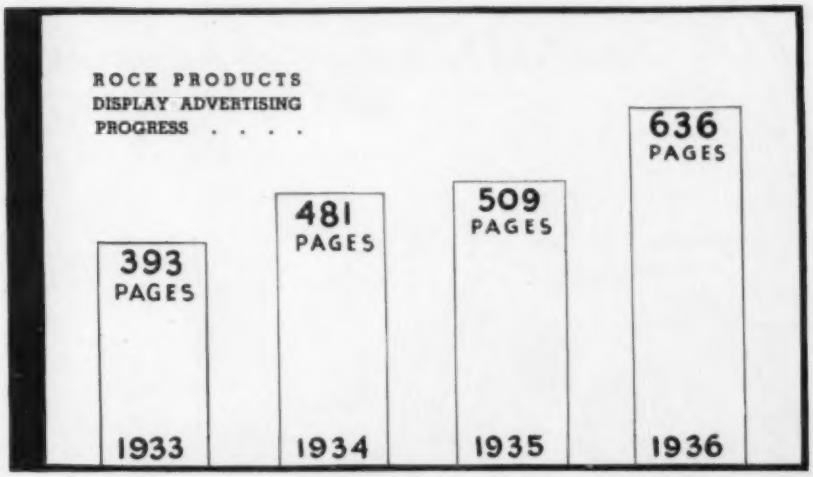
75% RENEWAL RATE

ROCK PRODUCTS publishes information of more value to the operators than is available in any text book; it is an encyclopedia in itself that helps ROCK PRODUCTS' readers solve many of their problems and gives them the news of the industry of which they are a part.

No inducements are offered for subscriptions, the rock products producers subscribing because of the value to them of the paper itself. The 75% renewal rate, which is practically uniform from year to year, is a direct measure of reader interest. It is as close to the maximum as possible, considering the personnel changes and normal mortality in the field.

Rarely does a paper permeate its field so thoroughly as does ROCK PRODUCTS. Each company paid-for subscription has been proved to have an average of between 3 and 4 regular readers.

ROCK PRODUCTS enables advertisers to influence positively the development of sales by influencing the men whose thinking, planning and choice of equipment, machinery and supplies are directly responsible for all purchases.



EDITORIAL

Editorial policy is the lodestone which attracts a magazine's readership. It determines the number, but more important, the type or class of the business paper's readers. On Editorial Policy alone depends the reader's attitude toward a paper—his confidence, his respect. If Editorial Policy gives authority to what a business paper says, this authority carries over into the advertising columns.

ROCK PRODUCTS Editorial Policy is simply this: to put all the important relevant material on the industry each month into concise and complete form so that it will stick in the reader's mind. Consequently ROCK PRODUCTS attracts no *casual* readers. Aware of ROCK PRODUCTS' objective, its readers read for a purpose. Knowing that nothing goes into ROCK PRODUCTS unless it is of value and importance, they read it from cover to cover.

To the entire rock products industry it is the prime authority — and what ROCK PRODUCTS says carries weight. Advertisements in ROCK PRODUCTS become part of the informative content upon which the industry depends because they appear in a journal which is relied upon.

Under the Editorial guidance of Nathan C. Rockwood, recognized international authority in the rock products field, this policy of excellence will always be maintained.

ADVERTISING

ROCK PRODUCTS always encourages the purchase of space on the basis of facts regarding readers' interest, editorial scope, elimination of waste circulation and coverage.

Today Advertising Executives are making greater use of these facts than ever before. We pledge continued help to the limit of our ability in obtaining all the facts pertaining to the rock products market and in the development of plans and copy aimed to bring the industrial advertiser the greatest possible return from his investment.

Over 85% of all advertisers in the rock products field last year used ROCK PRODUCTS. The largest volume of advertising in 1936 and all previous years has been carried by ROCK PRODUCTS, because of its excellence in the four essentials of sound circulation—1. Numerical adequacy—2. High reader interest —3. Sound distribution—4. Company paid circulation.

To further assist buyers of space in this field as to selection of media, we will send out a questionnaire or the advertiser or his agency may do so and we will assume all cost regardless of the result.

Rock Products

205 West Wacker Drive, Chicago, Illinois, U. S. A.

GEORGE M. EARNSHAW, *Eastern Manager*
56 West 45th Street, New York City

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Acetylene Welding Rod
American Steel & Wire Co. (U.S. Steel Corp. Subsidiary)

Aggregate De-dusters
Western Precipitation Co.

Agitators, Thickeners and Slurry Mixers
The Dorr Co.
Hardinge Co., Inc.
Manitowoc Engineering Wks.
F. L. Smidth & Co.

Airveyor
Fuller Co.

Air Compressors
Curtis Pneumatic Machy. Co.
Fuller Co.
Ingersoll-Rand Co.
Nordberg Mfg. Co.
F. L. Smidth & Co.
Sterling Machinery Corp.
Traylor Engr. & Mfg. Co.

Air Filters
Fuller Co.

Air Separators
Bradley Pulverizer Co.
Hardinge Co., Inc.
Raymond Bros. Impact Pulv. Co.
Sturtevant Mill Co.
Universal Road Machinery Co.
Williams Patent Crusher & Pulv. Co.

Applicator Bars
Stulz-Sickles Co

Arc Welders
Lincoln Electric Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backfillers
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.

Balls, Grinding, (See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co
Carnegie-Illinois Steel Corp.
Hardinge Co., Inc.
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co.

Batchers, Measuring Volume
Besser Mfg. Co.
Fuller Company

Bearings
Chain Belt Co.
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Bearings (Roller)
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
Timken Roller Bearing Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belting
Robins Conveying Belt Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Belt Lacing (Steel)
Flexible Steel Lacing Co.

Belting (Elevator and Conveyor)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Belting (Metal, Conveyor, High and Low Temperature)
Wickwire Spencer Steel Co.

Belting (Transmission)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Belting (V Type)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Bins
Universal Road Machinery Co.

Bin Gates
Allen-Sherman-Hoff Co.
Chain Belt Co.
Fuller Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Sprout, Waldron & Co., Inc.
Traylor Engr. & Mfg. Co.
Universal Road Machinery Co.

Bins, Concrete
Marietta Concrete Corp.

Bins, Hoppers
Besser Mfg. Co.
Blaw-Knox Co.
Traylor Engr. & Mfg. Co.

Bins, Sand and Gravel
Austin-Western Road Machy. Co.

Bins, Storage (Steel)
Besser Mfg. Co.
Chicago Bridge & Iron Co.

Blasting Cap Protectors
B. F. Goodrich Co.

Blasting Machines
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blasting Supplies
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blasting Powder (See Powder, Blasting)

Block Machines, Building
Besser Mfg. Co.
Miles Mfg. Co.
Multiplex Concrete Machy. Co.
Stearns Mfg. Co.

Block Machines, Silo
Besser Mfg. Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Bodies (Car & Motor Truck)
Easton Car & Construction Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Bolts
Standard Pressed Steel Co.

Boots and Shoes
B. F. Goodrich Co.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Brick Machines
Besser Mfg. Co.
Multiplex Concrete Machy. Co.

Bucket Dumps
Dempster Bros., Inc.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Geo. Haiss Mfg. Co., Inc.
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.
Owen Bucket Co.

Buckets (Dragline and Slackline)
Blaw-Knox Co.
Bucyrus-Erie Co.
Owen Bucket Co.
Page Engineering Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dredging and Excavating)
Harnischfeger Corp.
Owen Bucket Co.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Cross Engr. Co.
Hendrick Mfg. Co.
Huron Industries, Inc.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Robins Conveying Belt Co.

Bulldozers
Blaw-Knox Co.
Koehring Co.

Bushings (Machined or Processed)
Manganese Steel Forge Co., Inc.

Cableways
American Steel & Wire Co. (U.S. Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Link-Belt Co.
John A. Roebling's Sons Co.
Sauerman Bros.
Wellman Engineering Co. (G. H. Williams)
Williamsport Wire Rope Co.

Calcinators
Bradley Pulverizer Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Car Pullers
Link-Belt Co.

Cars (Dump)
Carnegie-Illinois Steel Corp.

Cars and Track, Industrial
Besser Mfg. Co.

Cars (Quarry & Gravel Pit)
Austin-Western Road Machy. Co.
Carnegie-Illinois Steel Co.
Easton Car & Construction Co.

Castings
Babcock & Wilcox Co.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
Manitowoc Engineering Wks.
F. L. Smidth & Co.

Cement Paints
Tamms Silica Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Blaw Knox Co.
Chain Belt Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.

Chain Drives
Chain Belt Co.

Chain (Elevating and Conveying)
Chain Belt Co.
Jeffery Mfg. Co.
Link-Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chimney Block Machines and Molds
Besser Mfg. Co.
Multiplex Concrete Machy. Co.

Chutes and Chute Liners
Earl C. Bacon, Inc.
Cross Engr. Co.
Good Roads Machinery Corp.

Clarifiers
The Dorr Co.
Hardinge Co., Inc.

Classifiers
The Dorr Co.
Hardinge Co., Inc.
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
American Steel & Wire Co. (U.S. Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Macwhyte Company
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co
Hardinge Company, Inc.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Collars (Shafting)
Standard Pressed Steel Co.

Colors, Cement
Geo. S. Mepham Corp.
Tamms Silica Co.

Compressors (See Air Compressors)

Concrete Breakers
Ingersoll-Rand Co.

Concrete Pipe Machinery
Universal Concrete Pipe Co.

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co.

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
C. O. Bartlett & Snow Co.
Chain Belt Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Conveyors and Elevators
Allen Sherman Hoff Co.
Earle C. Bacon
Besser Mfg. Co.
Chain Belt Co.
Fuller Company
Huron Industries, Inc.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Multiplex Concrete Machy. Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.
Universal Road Machinery Co.
Williams Patent Crusher & Pulv. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyors (Spiral)
Jeffrey Mfg. Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Air Hose)
Ingersoll-Rand Co.
Worthington Pump & Machinery Co.

Couplings (Flexible and Shaft)
Chain Belt Co.
Huron Industries, Inc.
Link-Belt Co.
Standard Pressed Steel Co.

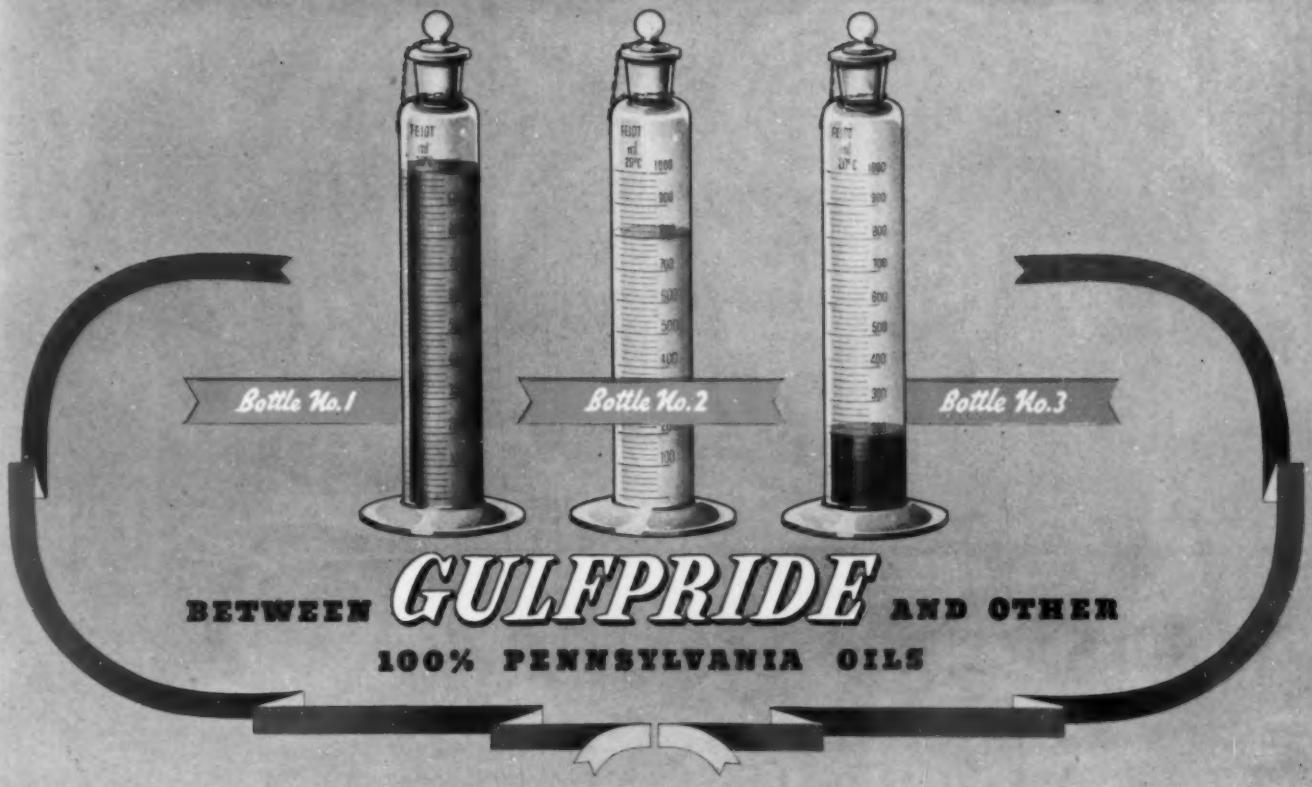
Couplings (Hose, Pipe, etc.)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Cranes (Air Powered)
Curtis Pneumatic Machy. Co.

Cranes (Clamshell)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Byers Machine Company
Harnischfeger Corp.
Koehring Co.
Manitowoc Engineering Wks.

Cranes (Crawler and Locomotive)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Byers Machine Company
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Link-Belt Co.
Manitowoc Engineering Wks.
Northwest Engineering Co.

THERE'S *THIS* DIFFERENCE



BETWEEN *GULFPRIDE* AND OTHER 100% PENNSYLVANIA OILS

Bottle No. 1 **contains a mixture of six well-known Pennsylvania motor oils—considered among the finest brands on the market. Put this mixture through a process called ALCHLOR refining—the patented process by which Gulfpride is refined—and what happens?**

Bottle No. 2 **gives the answer: Only 80% of the mixture remains—a purer, clearer, more highly refined oil. A full 20% has been discarded by the ALCHLOR process!**

Bottle No. 3 **contains the black residue which has been removed from the mixture. It is made up largely of harmful semi-lubricating waste that forms carbon, sludge and gum in a motor.**

* * *

IN SHORT, the ALCHLOR process can better the best competing Pennsylvania oils available. The ALCHLOR process starts where others stop. And Gulfpride oil is the only 100% Pennsylvania oil in the world made by the ALCHLOR process!

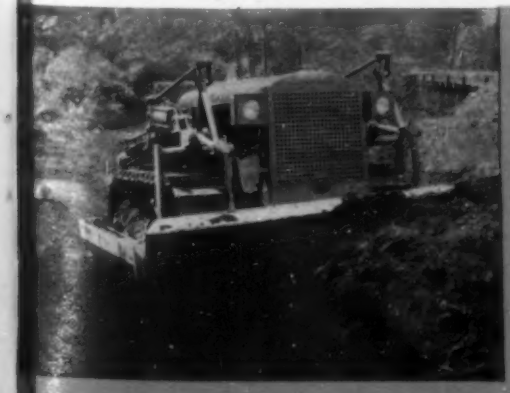
With Gulfpride in your automotive equipment, you know it is receiving the best protection ever afforded by a lubricant. You know that Gulfpride oil—stripped of the impurities which cause motor difficulties—will give you the safest, most economical lubrication you have ever had.

The first cost of Gulfpride is a little more than the cost of most other oils. But thousands of users have satisfied themselves that this superior lubricant saves its cost over and over again through the economies which accompany its use. We believe that in the long run, Gulfpride oil is the *least* expensive lubricant you can use.

Give it a trial in your equipment.

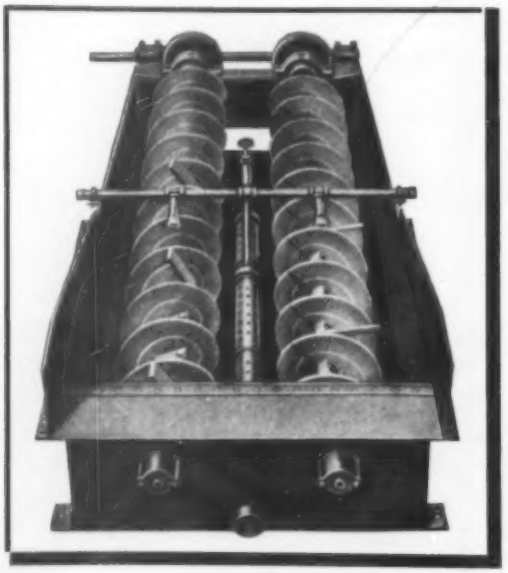
GULF OIL CORPORATION • GULF REFINING COMPANY

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.



GULF INDUSTRIAL LUBRICATION

Longer life for Diesel tractor equipment, lowest oil consumption and highest engine efficiency—those are the results Gulfpride users from Maine to Texas are reporting. Refined by the ALCHLOR process, Gulfpride costs little more than oils refined by less effective methods.



EAGLE WASHERS

Do a better job at lower cost

The installation of EAGLE SCREW OR PADDLE LOG WASHERS assure the positive elimination of sticks, leaves, silt, coal, shale and clay balls, and a thoroughly washed and scrubbed material.

EAGLE SCREW AND PADDLE LOG WASHERS are built of the highest quality material and designed for high efficiency, low operating cost, large capacity and long life.

EAGLE WASHERS have returned good profits from deposits formerly considered unprofitable.

No matter how unusual or difficult your washing problem may appear—you will find the solution in EAGLE WASHERS.

Write for the Eagle Literature Today

EAGLE IRON WORKS

DES MOINES, IOWA

Classified Directory—*Continued*

Cranes (Excavator)
Byers Machine Company
Koehring Co.

Cranes (Overhead Traveling Electric)
Curtis Pneumatic Machy. Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.

Crusher Parts
American Pulverizer Co.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Pennsylvania Crusher Co.

Crushers (Hammer)
Austin-Western Road Machy. Co.
The C. O. Bartlett & Snow Co.
Carnegie-Illinois Steel Corp.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Pennsylvania Crusher Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earle C. Bacon, Inc.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Good Roads Machinery Corp.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Lewistown Fdy. & Mach. Co.
(Jaw)
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Engr. & Mfg. Co.
Universal Road Machinery Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Reduction)
Earle C. Bacon, Inc.
Birdsboro Steel Fdry. & Mach. Co.
Bonnot Company
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
F. M. Welch Engineering Service

Crushers (Ring)
American Pulverizer Co.

Crushers (Roll)
American Pulverizer Co.
Gruendler Crusher & Pulv. Co.
New Holland Machine Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Rotary)
American Pulverizer Co.
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
American Pulverizer Co.
Austin-Western Road Machy. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
New Holland Machine Co.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.

Dedusters
Blaw-Knox Co.

Derricks and Derrick Fittings
Harnischfeger Corp.

Detonators
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Diaphragms (Pump)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Dippers and Teeth (Steam Shovel)
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co.

Ditchers
Bucyrus-Erie Co.
Harnischfeger Corp.

Draglines
Bucyrus-Erie Co.
Byers Machine Company
Harnischfeger Corp.
Link-Belt Co.
Manitowoc Engineering Wks.
Northwest Engineering Co.
Page Engineering Co.

Draglines (Gasoline or Electric)
Koehring Co.
Manitowoc Engineering Wks.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros., Inc.

Dragline Excavators
Bucyrus-Erie Co.
Northwest Engineering Co.
Page Engineering Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc. (Complete Steel)
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Drill Bits
Ingersoll-Rand Co.
Timken Roller Bearing Co.

Drill Sharpening Machines
Ingersoll-Rand Co.

Drill Steel
Ingersoll-Rand Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Ingersoll-Rand Co.
Worthington Pump & Machy. Co.

Drills (Wagon)
Ingersoll-Rand Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Manitowoc Engineering Wks.
Traylor Engr. & Mfg. Co.

Dump Bodies, Trucks
Athey Truss Wheel Co.

Dumptors
Koehring Co.

Dust Arresters
Western Precipitation Co.

Dust Collecting Systems
Allen Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
The C. O. Bartlett & Snow Co.
Blaw Knox Co.

Dust Conveying Systems
Allen Sherman Hoff Co.
Fuller Company
Western Precipitation Co.

Dynamite
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Electric Cables and Wires
American Steel & Wire Co. (U.S. Steel Corp. Subsidiary)
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Emery Mills
Sturtevant Mill Co.

Engineers
Bonnot Company
The Dorr Co.
Fuller Co.
Hetherington & Berner, Inc.
Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Engines (Diesel)
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Austin-Western Road Machy. Co.
Koehring Co.

Explosives
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Fans
General Electric Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Earle C Bacon, Inc.
Besser Mfg. Co.
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Good Roads Machinery Corp.
Hardinge Company, Inc.
(Weighing)
Jeffrey Mfg. Co. (Pan & Tube)
Robins Conveying Belt Co.
Schaffer Poidometer Co. (Weighing)
Smith Engineering Works (Plate)
Stearns Mfg. Co.

Flights
Cross Eng. Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Fuses (Electrical)
General Electric Co.

Galvanized Wire Strand
Macwhyte Company

Gaskets
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Gasoline
Texas Company

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.

Gears and Pinions
Chain Belt Co.
General Electric Co.
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples
Blaw Knox Co.
Hayward Co.
Owen Bucket Co.

Grease
Gulf Refining Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp.
Jeffrey Mfg. Co.

Grizzlies
Jeffrey Mfg. Co. (Vibrating)
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Engr. & Mfg. Co.

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Engr. & Mfg. Co.

Hammer Drills
Ingersoll-Rand Co.

Hammer Mills (See Crushers)

Heater, Bitumen
Easton Car & Construction Co.

Hoists
Curtis Pneumatic Machy. Co.
Harnischfeger Corp.
Ingersoll-Rand Co.
Link-Belt Co.
Northwest Engineering Co.
Sterling Machinery Corp.

Hooks (Wire Rope)
Macwhyte Company

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
B. F. Goodrich Co.
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Hose Couplings (See Couplings —Hose, Pipe, etc.)

Hydrators
Blaw-Knox Co.

I-Beam Trolleys
Curtis Pneumatic Machy. Co.

Insulation (Electric)
General Electric Co.

Kilns (Shaft)
Hardinge Company, Inc.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Bonnot Company
Chicago Bridge & Iron Co.
Hardinge Co., Inc.
Manitowoc Engineering Wks.
F. L. Smidth & Co.
Traylor Engr. & Mfg. Co.

Kominuters (See Mills)

Laboratory Crushers
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Lamp Guards
Flexible Steel Lacing Co.

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Hardinge Co., Inc.
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Chutes, Ball and Tube Mills, Tank and Pipe)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Northwest Engineering Co.
Robins Conveying Belt
Universal Road Machinery Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Gas-Electric)
Jeffrey Mfg. Co.

Locomotives (Geared)
Lima Locomotive Works, Inc.

Locomotives (Storage Battery)
General Electric Co.
Jeffrey Mfg. Co.

Locomotives (Steam, Gas and Electric
General Electric Co.
Lima Locomotive Works, Inc.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Guf Refining
Texas Company

Lubricants (Wire Rope)
American Steel & Wire Co. (U.S. Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Macwhyte Company

Machinery Guards
Harrington & King Perf. Co.

Magnets
General Electric Co.

Magnetic Pulleys
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co., Inc.

Manganese Steel Castings
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
Manganese Steel Forge Co., Inc.

Material Handling Equipment
Jeffrey Mfg. Co.

Mechanical Rubber Goods
B. F. Goodrich
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp.
Hardinge Company, Inc.
Jeffrey Mfg. Co.
F. L. Smidth & Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Engr. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mine Handling Equipment
Chain Belt Co.

Mine Car Hitchings
Macwhyte Company

Mixers (Commercial Concrete)
Jaeger Machine Co.

Giving You *Real* Value!

GOODNESS of materials and workmanship are taken for granted. A buyer expects a product to serve him well. He assumes that design and engineering are right. *Purchase finally involves the reputation of the maker!* So what of his aims . . . policies . . . and method of thinking!

What's his *big* reason for being in business? What can he give you that others cannot? *The answers will determine the value you'll receive for your money!*

HARDINGE COMPANY, INCORPORATED, was founded on the highest standards of business ethics and the idea of giving the greatest possible value commensurate with price!

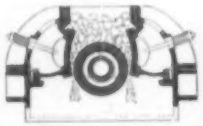
In thus adhering to its original ideals, Hardinge has now reached a high peak in volume — a special advantage to you, because it assures machinery produced under the most favorable conditions, *the utmost in value for your dollar!*

Write for descriptive Bulletins. And a discussion of your problems with one of our Sales Engineers may be helpful to us both.

HARDINGE COMPANY
INCORPORATED
YORK, PENNA.—Main Office & Works
NEW YORK—122 E. 42nd St. CHICAGO—205 W. Wacker Drive
SAN FRANCISCO—501 Howard St. DENVER—817 17th St.

Makers of

HARDINGE CONICAL MILLS
RUGGLES-COLES DRYERS
HARDINGE THICKENERS
COUNTER CURRENT CLASSIFIERS
CONSTANT WEIGHT FEEDERS



BONNOT

REDUCTION CRUSHERS PAY BIG DIVIDENDS

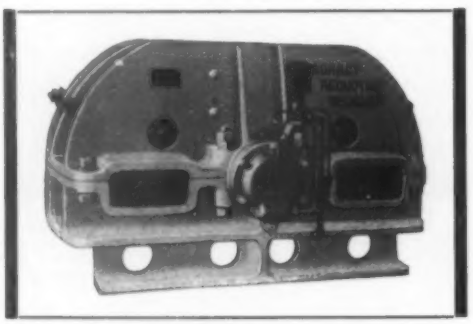
The BONNOT Reduction Crusher requires less power. Maintenance cost is lower too. There is no rubbing or abrasive action to produce fines. Less rejections; no oversize or slabs are found in finished product.

Free crushing with a beam or snap action makes possible the production of 30 tons per hour of 1 in. minus material with less than 9 horsepower.

Concaves are reversible—liners are renewable—safety plates of cast iron and other features designed for long wear and the economical, efficient and profitable operation of this rugged crusher definitely increase profits.

The BONNOT CRUSHER can be started fully loaded.

Ask for bulletin No. 150. This shows how material is made in one pass as compared with slabby material produced by less efficient crushers.



THE BONNOT CO.

CANTON, OHIO

— SINCE 1891 —

New York Office: 30 Church Street

Classified Directory—*Continued*

Mixers (Concrete)
Besser Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jaeger Machine Co.
Koehring Co.
Multiplex Concrete Machy. Co.

Mortar Colors
Geo. S. Mepham Corp.
Tamms Silica Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
General Electric Co.
Harnischfeger Corp.

Motors and Starters (Alternating Current Induction)
Lincoln Electric Co.

Nitramon
E. I. du Pont de Nemours & Co., Inc.

Nozzles (Gravel Washing)
Chain Belt Co.

Nuts (Lock)
Standard Pressed Steel Co.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Oils (Lubricating)
Gulf Refining Co.
Texas Company

Packings (Pump, Valve, etc.)
B. F. Goodrich
Hewitt Rubber Corp.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Paint (Asphalt)
Texas Company

Pallets
Besser Mfg. Co.
Commercial Shearing and Stamping Co.
Miles Mfg. Co.
Multiplex Concrete Mfg. Co.
Stearns Mfg. Co.

Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Wickwire Spencer Steel Co.

Pipe Machines
Besser Mfg. Co.

Pipe Molds (Concrete)
Besser Mfg. Co.
Stearns Mfg. Co.
Universal Concrete Pipe Co.

Plates
Cross Eng. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.

Portable Crushing and Screening Unit
Austin-Western Road Machy. Co.
Good Roads Machy. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Portable Loaders
Jeffrey Mfg. Co.

Powder (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Power Tampers
Besser Mfg. Co.

Power Transmission Machinery
Chain Belt Co.

Power Transmission Equipment
Standard Pressed Steel Co.

Pulleys, Magnetic (See Magnetic Pulleys)

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co
Austin-Western Road Machy. Co.
American Pulverizer Co.
Babcock & Wilcox Co
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Pennsylvania Crusher Co
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Universal Road Machinery Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
Allen-Sherman Hoff Co.
The Dorr Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allen-Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Ingersoll-Rand Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
Allen-Sherman Hoff Co.
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allen Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons

Quarry Cars
Easton Car & Const. Co.

Racks or Decks for Lift Trucks
Besser Mfg. Co.

Railway Equipment
General Electric Co.

Ready Mixed Concrete Plants
Blaw-Knox Co.

Ready Mixed Concrete (Truck Mixer Bodies)
Blaw-Knox Co.

Reciprocator Feeder for Unloading Hopper Bottom Cars
Besser Mfg. Co.

Recuperators
Manitowoc Engineering Wks.

Reinforcement Fabric (Concrete)
Wickwire Spencer Steel Co.

Road Machinery
Blaw-Knox Co.
Harnischfeger Co.
Koehring Co.
Northwest Engineering Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Hardinge Co., Inc.
Traylor Engr. & Mfg. Co.

Rods (Wire)
Wickwire Spencer Steel Co.

Roller Bearings
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Rotary Screens (Sections and Segments)
Hendrick Mfg. Co.

Rubber Covered Screens
B. F. Goodrich Co.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Sack Balers
Besser Mfg. Co.

Sand Drag
Smith Engineering Works

Sand and Gravel Handling Equipt.
Sprout, Waldron & Co., Inc
Universal Road Machy. Co.

Sand Settling Tanks
Jeffrey Mfg. Co.
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Austin-Western Road Machy. Co.
Blaw-Knox Co.
Harnischfeger Corp.
Link-Belt Co.
Northwest Engineering Co.
Sauerman Bros., Inc.

Screens
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
The C. O. Bartlett & Snow Co.
Besser Mfg. Co.
Carnegie-Illinois Steel Corp.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.

Cross Engineering Co.
Hardinge Co., Inc.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Ludlow-Saylor Wire Co.
Manganese Steel Forge Co., Inc.
New Holland Machine Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Simplicity Engineering Co.
Robins Conveying Belt Co.
John A. Roebling's Sons Co.
Smith Engineering Works
Sturtevant Mill Co.
Traylor Engr. & Mfg. Co.
Universal Road Machinery Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Screens (Perforated
Hendrick Mfg. Co.

Screens (Testing)
Hendrick Mfg. Co.

Screens (Vibrating)
Austin-Western Road Machy. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Robins Conveying Belt Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screens (Woven Wire)
Wickwire Spencer Steel Co.

Screw Conveyors
Besser Mfg. Co.

Screw Rewasher (Single and Twin)
Smith Engineering Works

Screws (Cap, Self Locking, Set, Hollow Set)
Standard Pressed Steel Co.

Scrubbers, Washers
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
Hardinge Company, Inc.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works

Seal Rings
Traylor Engr. & Mfg. Co.

Separators (Magnetic)
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co.
Byers Machine Company
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Link-Belt Co.
Manitowoc Engineering Wks.
Northwest Engineering Co.
Thew Shovel Co. (Crawling Tractor)

Silos
Chicago Bridge & Iron Wks.
Marietta Concrete Corp.
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary)
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Smokestacks
Chicago Bridge & Iron Co.

Sockets (Wire Rope)
American Steel & Wire Co (U. S. Steel Corp. Subsidiary)
Macwhyte Company

Special Aggregates
Tamms Silicon Co.

Speed Reducers
Huron Industries, Inc.
Link-Belt Co.
Traylor Engr. & Mfg. Co.

Springs (Extension, Compression, Torsion or Flat)
Wickwire Spencer Steel Co.

Sprockets and Chain
Chain Belt Co.
Jeffrey Mfg. Co.

Standpipes
Chicago Bridge & Iron Co.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Steels, Drill (See Drill Steel)

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Storage Equipment
Marietta Concrete Corp.

Strippers
Besser Mfg. Co.

Stucco Materials
Geo. S. Mepham Corp.

Tanks
Chicago Bridge & Iron Co.
Combustion Engineering Corp.
The Dorr Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Worthington Pump & Machy. Co.

Thickeners
The Dorr Co.
Hardinge Co., Inc.

Thimbles
Macwhyte Company

Tile Machines (Drain)
Besser Mfg. Co.

Tires and Tubes
B. F. Goodrich Co.

Track Equipment
Carnegie-Illinois Steel Corp.
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co.

Trailers, Industrial
Athey Truss Wheel Co.
Easton Car & Construction Co.

Tramways (Aerial Wire Rope)
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Huron Industries, Inc.
Timken Roller Bearing Co.

Troughs
Cross Engr. Co.

Truck Bodies (Dump)
Easton Car & Construction Co.

Truck Bodies (Ready Mixed Concrete)
Blaw-Knox Co.
Chain Belt Co.
Jaeger Machine Co.

Trucks (Mixers)
Blaw-Knox Co.
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube Mills (See Mills, Ball, Tube, etc.)

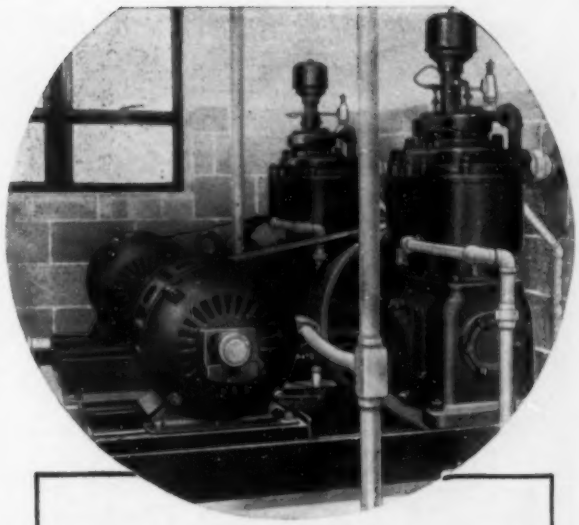
Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Turbuckles
Macwhyte Company

Turntables (Railway, Industrial)
Easton Car & Construction Co.



Proven Economy

IN

CURTIS COMPRESSORS

Actual operating records prove that Curtis compressors provide dependable air service at a minimum cost. Curtis' 83 years' engineering experience is reflected in this unusual economy, the result of such design features as:

- *Timken Roller Bearings*
- *Carbon-free Disc Valves*
- *Centro-ring Oiling*
- *Fully enclosed*
- *All parts readily accessible*
- *Capacities up to 360 CFM*

Let us send you the proof of Curtis economy. Write for Bulletin C4B and surveys giving facts and figures on actual records of Curtis installations.

CURTIS PNEUMATIC MACHINERY CO.
1988 Kienlen Ave., St. Louis, Mo.
NEW YORK • CHICAGO • SAN FRANCISCO

CURTIS

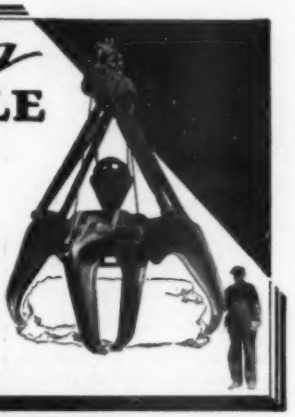
COMPRESSORS • AIR HOISTS
I-BEAM CRANES AND TROLLEYS

Classified Directory—*Continued*

Underground Shovels
Nordberg Mfg. Co.
Valves (Pump)
B. F. Goodrich Co.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Vibrating Screens (See Screens, Vibrating)
Wagons and Trailers (Heavy Duty, Dump)
Athey Truss Wheel Co.
Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
The Dorr Co.
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Hardinge Copmany, Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Traylor Engr. & Mfg. Co.
Universal Road Machinery Co.
Waste Heat Boilers
Combustion Engineering Corp.
Waterproofing
Tamms Silica Co.
Weighing Equipment
Schaffer Poidometer Co.
Weigh-Mix
Koehring Co.
Welding and Cutting Apparatus
General Electric Co.
Harnischfeger Corp.
Lincoln Electric Co.
Welding Electrodes
Lincoln Electric Co.
Stulz-Sickles Co.
Welding Rod
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary)
Joseph T. Ryerson & Son, Inc.
Welding Supplies
Lincoln Electric Co.
Welding Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary)
John A. Roebling's Sons Co.
Wheels, Trackla ying Type
Athey Truss Wheel C
Wire (Flat, Round, Square or Special Shapes)
Wickwire Spencer Steel Co.
Wire (Manganese Steel)
Manganese Steel Forge Co., Inc.
Wire (Piano and Music)
Wickwire Spencer Steel Co.
Wire (Rubber Insulated)
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary)
Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
Ludlow-Saylor Wire Co. Inc.
Manganese Steel Forge Co.,
John A. Roebling's Sons Co.
W. S. Tyler Co.
Wickwire Spencer Steel Co.
Wire Rope
American Cable Co., Inc.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Wickwire Spencer Steel Co.
Williamsport Wire Rope Co.
Wire Rope Fittings
American Cable Co.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary)
Broderick & Bascom Rope Co.
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.
Wire Rope Slings (See Slings, Wire Rope)
Wire Rope Sockets (See Sockets, Wire Rope)

with Octopus-Like cunning
The OWEN *TYPE "RA"* GRAPPLE

grips and lifts rocks, regardless of shape... Each of 4 tines makes contact with the rock, handling its share of the load. Easier placement and greater security of grip assure increased tonnage in handling rocks, scrap iron, timbers, etc. Write for new bulletin.



THE OWEN BUCKET COMPANY
6040 Breakwater Avenue • Cleveland, Ohio
Branches: NEW YORK • PHILADELPHIA • CHICAGO • BERKELEY, CAL.

SHAYS ARE DIFFERENT

---But So Is Quarry Haulage!

SHAYS are designed for haulage over steep grades, around sharp curves and over light track—the very problems the quarry engineer must solve.

With Shays every wheel is a driving wheel; every pound of weight, adhesive weight. A three cylinder engine drives through a flexible shaft geared to the wheels. Shay locomotives haul full loads anywhere a car can follow.

For economical, low cost haulage the Shay locomotive offers maximum returns.

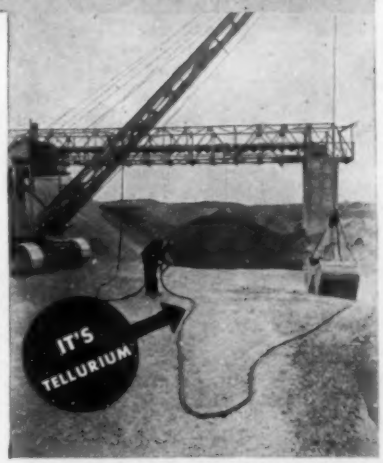
LIMA LOCOMOTIVE WORKS, Incorporated
LIMA, OHIO
Sales Office: 60 E. 42nd St., New York, N. Y.

Cement Clinker Cuts like Emery... But CABLE Not Worn At All

Thus writes William Fowden, *plant manager of The South Dakota Cement Plant, Rapid City, S. D.*

Part of Mr. Fowden's letter is as follows:

"... *and I am more than satisfied with the cable we are using on our electric shovels and electric yard crane. It is pulled around in a pile of cement clinkers which has almost the cutting properties of emery. As yet we have not had any trouble with the cable, and cannot see that it has worn at all.*"



A visitor closely examines the G-E Type W three-conductor tellurium-rubber cable, in use at the South Dakota Cement Plant, and can find no signs of wear

Four Years' Service

This cable is a G-E tellurium-cured all-rubber type, three-conductor, No. 2 Awg.

It was installed in January, 1932, and when a G-E representative examined it on October, 16, 1936 he found little signs of wear, despite this nearly four years of hard service. It was once run over by a 75-ton steam locomotive, and the jacket was somewhat damaged, but a simple jacket repair put it back in service.

Tellurium-cured

The jacket on this G-E portable cable is cured or vulcanized by a special G-E process, using the element tellurium. The process results in a protective covering that is not only tough and capable of resisting abrasion, but which is also long aging and able to withstand the rays of the sun.

A Type for Every Use

You can get this G-E portable cable in every type and size, one of which is best suited for a coal-cutting, loading, or conveying machine—for an electric shovel, crane, hoist, or dredge—for a portable motor or compressor—for an arc-welding machine—in fact, for every kind of portable electric equipment.

May we send you a copy of our Bulletins GEA-1728 and GEA-1918, which give prices and specifications? Address nearest G-E sales office, or General Electric, Dept. 6A-201, Schenectady, N. Y. 520-107

GENERAL ELECTRIC

CROSS
DIE PERFORATED PLATES
FOR MAXIMUM PROFITS

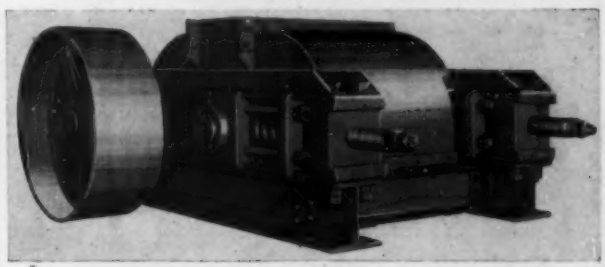
BETTER SCREENING AT LOWER COST

CROSS SCREENS are always more economical and give operators high capacity production of accurately sized material at lower cost. CROSS SCREENS last longer and are fairly priced. Standardize on CROSS SCREENS for 1937 and see what a genuine saving they make. Write us for full particulars.

CROSS ENGINEERING CO.
MAIN OFFICE AND MFG. PLANT
CARBONDALE, PA.
Sales Offices Principal Cities

GREENVILLE ROLL CRUSHERS

Designed Along Sound, Practical Engineering Principles
WITH OR WITHOUT FEEDERS



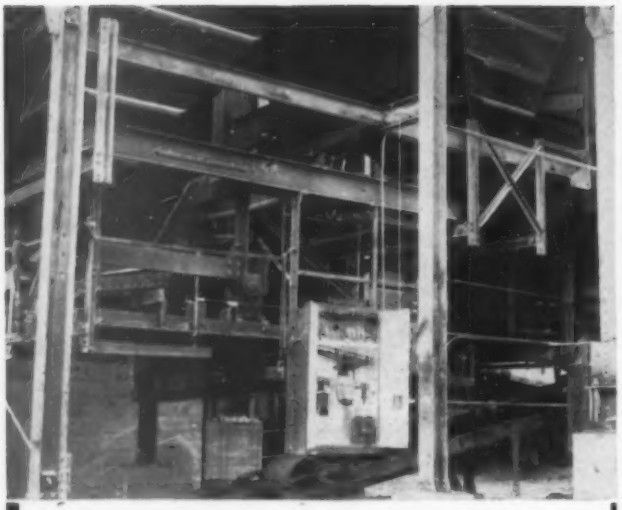
COMPACT, POWERFUL, DOUBLE ROLL CRUSHERS

MADE IN ALL SIZES
CORRUGATED OR PLAIN
TO MEET ALL CONDITIONS

Convert your SURPLUS SIZES of gravel or crushed stone into MARKETABLE MATERIAL

Write your requirements to the

F. M. WELCH ENGINEERING SERVICE
GREENVILLE, OHIO



RICHARDSON
CONVEY-O-WEIGHS
Protect Profits

Above illustration shows interior of cement plant where four Richardson Convey-o-weighs were installed to accurately proportion shale and limestone, clinker and gypsum, thus assuring a uniform product and no spoiled mixes. The machines weigh and record and deliver materials without interruption. Sturdy construction plus simplicity of design reduces maintenance to the minimum.

Richardson Convey-o-weighs will proportion any two or more ingredients—they may also be used for weighing any single material as received, as processed, as fired to or discharged from kilns, to storage or in shipment.

Let our engineers assist you in planning an installation of CONVEY-O-WEIGHS that will positively and accurately control your operations, reduce costs and send your profits upward.

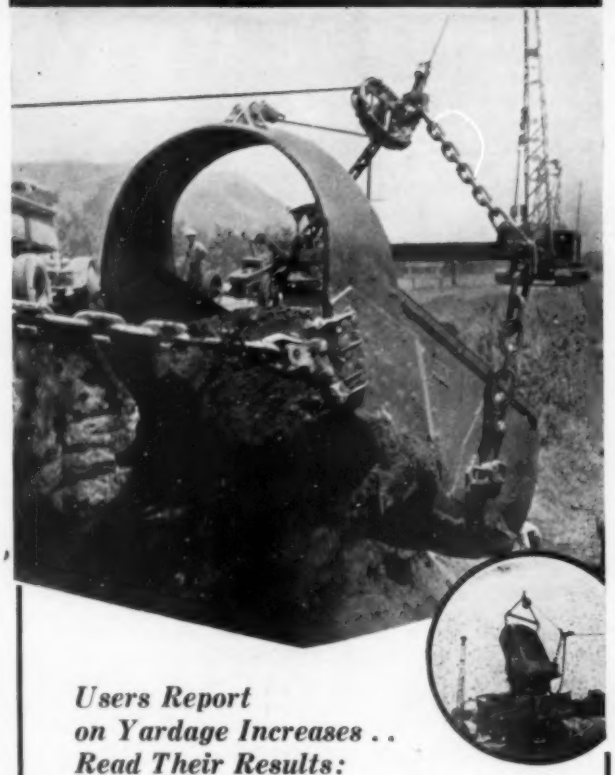
Richardson Scale Company

CLIFTON, NEW JERSEY

NEW YORK MINNEAPOLIS CHICAGO OMAHA BOSTON SAN FRANCISCO SYRACUSE ATLANTA PHILADELPHIA WICHITA COLUMBUS

Agents for Eastern Canada: Messrs. Peacock Brothers, Ltd., Montreal & Toronto

Speed up DRAGLINE WORK 20% to 50% *with a* PAGE AUTOMATIC



Users Report on Yardage Increases . . Read Their Results:

One Contractor writes:

• "Excavation was around walls and involved the digging of hard clay to a depth of 28 feet. This work was completed in three months—one-half the time we figured necessary."

Another AUTOMATIC owner reports:

• "We are stripping 25' overburden, some of which is hardpan and rock. Since putting on the AUTOMATIC we are stripping at least 50% more material."

• From letters in our files.

Ask any AUTOMATIC owner or operator about their yardage records with the patented rounded front AUTOMATIC bucket! Then see your equipment dealer or write us direct for information on a size and weight bucket best suited for your machine and job. Bulletin, "THE AUTOMATIC," gladly sent on request.

BUILT IN SIZES 3/8 to 15 CUBIC YARDS

DIG WITH A PAGE AUTOMATIC

ADDRESS: DEPARTMENT "K"

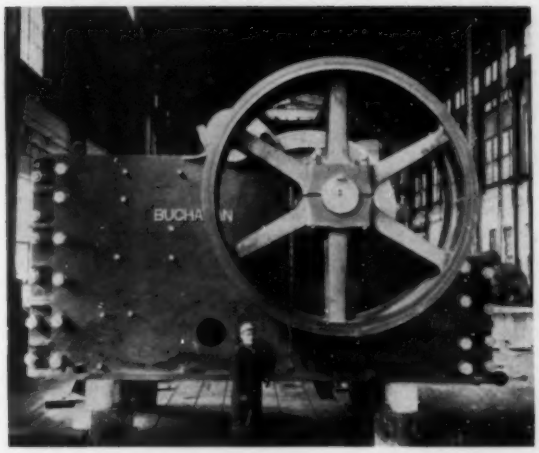
PAGE ENGINEERING COMPANY

CLEARING POST OFFICE CHICAGO, ILLINOIS

BIRDSBORO BUCHANAN

ALL-STEEL CRUSHERS

Do a Better Job of Crushing



BIRDSBORO-BUCHANAN TYPE C ALL-STEEL JAW CRUSHER

Every plant has its problems in crushing. What is yours? Perhaps you are not getting the maximum production. Perhaps the cost per ton is too high. Are you getting just the product you want? A different type machine might produce better results. How about the power consumption of your equipment? What about the cost of repairs? Can you save on labor? Are you entirely satisfied? It's the net profit that counts. We may be able to help you. Send for Bulletins!

C. G. BUCHANAN CRUSHING MACHINERY DIVISION

of BIRDSBORO STEEL FOUNDRY & MACHINE CO.

90 West St., New York, N. Y.

REPRESENTED IN CANADA BY FRASER & CHALMERS OF CANADA, LTD., 1411 CRESCENT ST., MONTREAL, QUE., G. E. Sanction, Gen. Mgr.

Cutting Handling Costs in Two . . . .

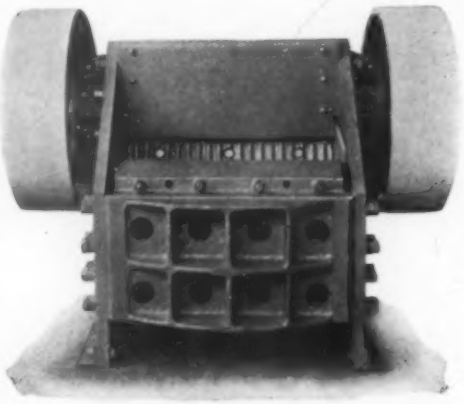
On this job a new Industrial Brownhoist gas crane replaced an old steam machine. The operation consists of unloading aluminum ore from vessel to hopper, whence it is trucked to the plant. With the old crane, the costs including interest, depreciation, and truck hire were between 70 and 80 cents a ton. The new crane, with an Industrial Brownhoist bucket, unloads 110 tons per hour against the old average of 35 to 40 tons and the costs are 40 cents per ton.

If you have not checked your own handling costs recently, it will pay you to do so. You will find that the new Industrial Brownhoists, especially the gasoline and Diesel models, are faster, more economical and much easier to operate than any crane you have ever had. Isn't this worth looking into?

GENERAL OFFICES
BAY CITY, MICHIGAN

INDUSTRIAL BROWNHOIST

NEW YORK, PHILADELPHIA
CLEVELAND, CHICAGO

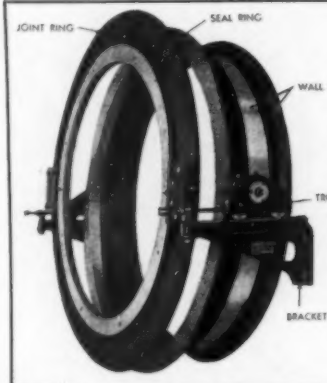


"2 in 1"

A GOOD ROADS primary-reduction crusher can replace two ordinary crushers. Made in three sizes.

Write for information.

GOOD ROADS MACHINERY CORP.
Kennett Square, Pa.

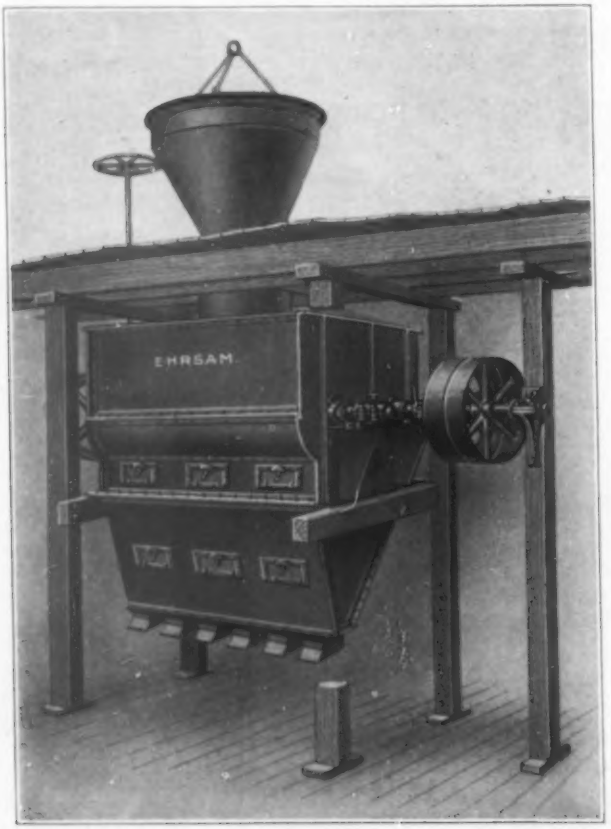


Save Fuel
STOP DUST LOSS

HURON
SEAL RINGS

A practical, effective means of sealing joints between the revolving and stationary part of rotary kilns, dryers and coolers, resulting in an increase of 7 to 12% in kiln efficiency. Additional savings are effected in labor and maintenance. The use of Huron Seal Rings safeguard profits and pay worthwhile dividends on the investment. Write for bulletin which contains much data of interest to operators.

HURON INDUSTRIES CO.
ALPENA, MICHIGAN



THE EHRSAM
Double Barrel Plaster MIXER

For Mixing Dry Ingredients Such as Plaster-Paris or Stucco with Fibre and Retarder. Also various Ingredients with Stucco, Portland Cement, Lime and Sand.

Equipped for Hand Sacking or Bates Bagger.

Used in Gypsum Plaster Mills Throughout the United States.

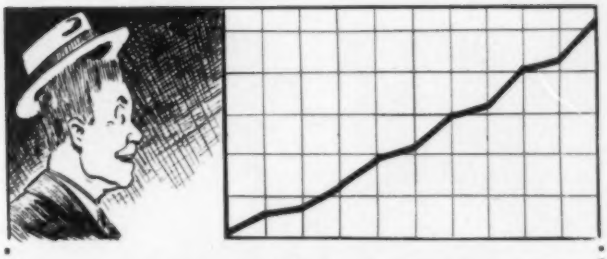
Capacities from Ten to Twenty Tons per Hour.

We specialize in the manufacture of calcining kettles, crushing and grinding equipment for gypsum plaster plants. Also the manufacture of wet mixers, forming machines and automatic cut-off machines and other equipment for the manufacture of gypsum wall board.

We also have complete engineering service for the lay-out and general design of such plants.

Chicago Sales Rep.:
W. H. KENT, 549 W. Washington Blvd., Chicago

The J. B. Ehrsam & Sons Mfg. Co.
ENTERPRISE **KANSAS**



RATHER SURPRISED US!

One of the hundreds of letters received from users of UNIVERSAL VIBRATING SCREENS, reads: *"The efficiency of your Universal Screens has rather surprised us and by their use we have not only been able to materially increase our capacity, but in addition the quality of our Product has greatly improved."*

For many years, 40 to 50% of our vibrating screen production has been shipped on repeat orders to satisfied users.

UNIVERSAL VIBRATING SCREENS are lower in first cost—operating cost and maintenance cost. Only such parts as are essential to efficient screening are embodied in their design. Send for catalog and prices.

UNIVERSAL VIBRATING SCREEN CO.
RACINE — — WISCONSIN

ROPE-REEVE • POWER-WHEEL • LEVER-ARM

Buckets

capacities 1/2 to 15 yards

The right type and size for every kind of work. Write for Catalog.

INDUSTRIAL BROWNHOIST

GENERAL OFFICES: BAY CITY, MICHIGAN
New York, Philadelphia, Cleveland, Chicago

ALLIGATOR

TRADE MARK REG. U.S. PAT. OFFICE

STEEL BELT LACING

The smooth, durable hinged joint of Alligator Steel Belt Lacing is the most universally used of all belt lacings. Clinched teeth compress belt ends firmly, reducing destructive internal friction and ply separation. Twelve sizes in steel, "Monel Metal," and alloys for belts up to 5/8 in. Standard boxes, "Handy Packages," and long lengths.

Sold at wholesale and retail throughout the world.
Sole Manufacturers

FLEXIBLE STEEL LACING CO.
4684 Lexington Street, Chicago
In England at 185 Finsbury Pavement, London, E.C.2

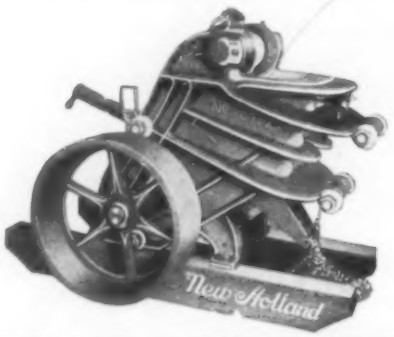
REG. U. S. PAT. OFFICE

Front View Showing Breaker Plate Adjustment

25 YEARS OF KNOWING HOW

AMERICAN Crushers are backed by 25 years' experience in designing and manufacturing reduction equipment. These sturdy, compact, crushers are equipped with SKF Special Roller Bearings and Cast Steel Adjustable Platten. The Crushing Chamber is Manganese Lined. The American Crusher is lower in first cost and built for long profitable service. There is no annoyance from slivers or chips. Let us send complete details and prices. Write us today.

AMERICAN PULVERIZER COMPANY
1245 Macklind Ave. St. Louis, Mo.



THESE FEATURES SAVE MONEY

NEW HOLLAND Jaw Crushers have an in-built experience of 30 years—they are used, and recommended all over the world.

They are economical in first cost and maintenance. Cost of installation is low — require minimum power to operate—have extra long swing arm bearing. The main frame is made of semi-steel of high tensile strength securely reinforced. All New Holland Crushers can be fitted with jaws of different corrugations to meet specific needs. Ask for literature covering New Holland Crushers, Crushing Rolls and Screens.

NEW HOLLAND MACHINE CO.
NEW HOLLAND, PENNSYLVANIA

(Left) Crescent Scraper, attached to carrier running on 800-ft. cable span, moves gravel from deep pit to plant; (Right) Crescent Scraper stores and reclaims surplus output of large screening plant.

The only *Streamlined* Scraper is the Sauerman CRESCENT

The unique feature of Sauerman Crescent scraper buckets is the streamline design. These buckets are all gentle curves and flat angles, making for easy penetration of earth materials with slight application of power. The streamline design promotes a smooth "flow" of materials into and out of the bucket, assuring rapid loading and dumping; also enables the bucket to move back and forth over the ground at high speed.

SAUERMAN BROS., 430 S. Clinton St., Chicago

Crescent Scrapers are built in all wanted sizes from ¼ to 15 cu. yd. For complete data write for Bulletin 147.

Modernize the MARIETTA Way

The MARIETTA Material Handling System makes possible the handling and storage of COAL—SAND—GRAVEL—LIME and other materials with maximum efficiency at a real saving in dollars and cents.

The services of experienced engineers, specializing in storage plant design, are available to you in working out the most economical methods of operation.

Let Marietta modernize your plant and assure bigger dividends on your investment. Write for catalog.

THE MARIETTA CONCRETE CORP.
MARIETTA, OHIO

START THIS *Screening Season*

. . . WITH

HENDRICK

Perforated plate that will assure you the utmost production with a minimum of replacements . . . by Hendrick.

Any shape of opening . . . select the one best suited to the job . . . round, square, hexagonal, slotted, Squaround* . . . of any desired metal . . . from Hendrick.

Prompt, efficient service, and intelligent cooperation in filling your requirements . . . from Hendrick.

Three reasons why you should start this screening season . . . with Hendrick.

* Reg. U. S. Pat. Off.

HENDRICK MANUFACTURING CO.
47 Dundaff St., Carbondale, Pa.

SALES OFFICES IN PRINCIPAL CITIES
PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types. Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

When steel is needed in a hurry you can depend upon Ryerson for quick action. Complete stocks of all kinds of steel products, including Ryerson Abrasion Resisting Sheets and Plates, bars, structurals, bolts and nuts, rivets, boiler fittings, chain, etc. Order from the nearest plant. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

STEEL

PULVERIZERS

Capacities—1 to 50 Tons per hr.
Finenesses—20 to 350 Mesh.

AIR CLASSIFIERS

Sizes for any desired capacity.

The MODERN **AIR SEPARATOR**

BRADLEY PULVERIZER CO.
ALLENTOWN, PENNA.

EASTON

Manufacturers and consultants
All kinds of Quarry Transportation, whether Cars, Truck Bodies or Trailers.

•

EASTON CAR & CONST. CO.
Easton, Pa.

PRODUCE HIGH EARLY STRENGTH

Normal, all-purpose, masonry, plastering and stuccoing cements under the several BLANK patented processes.

•

Inquiries invited from producers of cement, lime and allied products.

Patents issued and pending in the United States, Canada, and in leading Central and South American and European Countries.

Investigations and experimental tests carried out at plants of interested producers by technical experts familiar with processes at no cost to producer.

CEMENT PROCESS CORP.

Cement Plants Division
JOHN A. BLANK, Mgr.,
R. F. D. No. 1,
Allentown, Pa.

MAIN OFFICE
90 Broad Street
New York

Lime Plants Division
WM. J. KUNTS, Mgr.,
P. O. Box 574,
York, Pa.

MEXICAN BRANCH
P.O. Box 515, Mexico City, Mexico

. . . for Efficient Screening Over Entire Area

USE LINK-BELT *VIBRATING SCREENS* •

Designed and built to be easy on itself — to avoid unnecessary wear—the Link-Belt Vibrating Screen lasts a long time with few repairs. Low in first cost —low in maintenance—an economical screen to operate. Send for 24-page illustrated catalog, complete with clearance diagrams and dimension tables on the two distinct types of Link-Belt vibrating screens ("UP" and "PD").

Ask for No. 1562. Address Link-Belt Company, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, Toronto, or any of our offices located in principal cities.

8074

PROVEN PERFORMANCE

NOT THEORY

ANOTHER WAY OF SAYING

SIMPLICITY GYRATING SCREENS

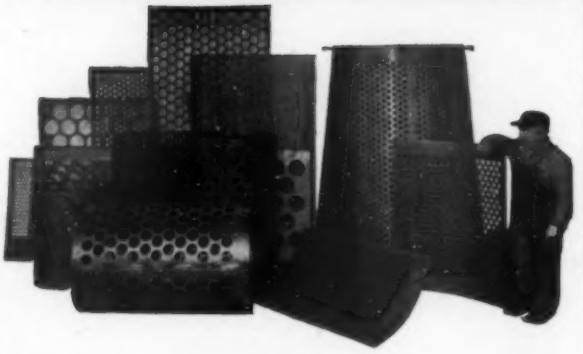
The first Simplicity Gyrating Screen was built in 1922 to solve a particularly difficult screening problem. Since then many such problems have been satisfactorily solved by the installation of Simplicity Screens.

Close cooperation between the field operators and our engineers have enabled us to add refinements to the correct basic screen idea of 1922, so that the Simplicity Gyrating Screen has continued to lead in *Capacity, Efficiency* and *General Operating Conditions.*

SIMPLICITY ENGINEERING CO.

DURAND, MICHIGAN

SCREENS of Perforated Metal



For Sand, Gravel, Stone and Ore. Perforations of all standard types, also of unusual sizes and layouts to give large production and reduced screening costs.

The Harrington & King PERFORATING CO.

5650 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N. Y.

For Payloads That ARE Payloads . . .

WILLIAMS POWER-ARM, POWER-WHEEL, MULTIPLE-ROPE, DRAGLINE ..... *buckets*

Williams buckets are digging demons. They master the toughest digging work at a saving of crane time. *Write for bulletins.*

THE WELLMAN ENGINEERING CO.

7008 Central Ave. Cleveland, Ohio

NOTE THESE FACTS

DEMPSTER DUMPSTERS can be mounted on any truck. Buckets are spotted at desired points—loaded — picked up and dumped at destination and then respotted. Continuous operation plus one-man control earns unusual profits. Write us.

DEMPSTER BROTHERS, INC. KNOXVILLE, TENN.

WILFLEY Centrifugal SAND PUMP

PATENTED

for Slurry
for Sand Tailings

ELIMINATION of stuffing box has done away with many troubles common to centrifugal pumps.

Pump maintains extraordinary efficiency.

Pumping parts unusually heavy, insuring long life. Cleaning out pump or changing wearing parts requires only a few minutes.

Described and illustrated in Catalog No. 6

A. R. Wilfley & Sons, Inc., Denver, Colo., U. S. A.

New York Office: 1775 Broadway

CLASSIFIED ADVERTISEMENTS

Used Equipment for Sale

CONSOLIDATED
GOOD USED EQUIPMENT

4—Raymond Roller Mills—3 and 5-roll, high side; 5-roll low side.
6—Raymond Pulverizers, No. 0000, 00, 1, 3.
8—Raymond Imp Mills,—No. 3, 45, 50, 55.
6—Hardinge iron lined Ball Mills, 3'x8", 4½'x16", 6'x22"; also other sizes.
1—6'x22" Hardinge silex lined Pebble Mill.
1—10' Sturtevant Air Classifier.
2—Gayco Air Separators, 30", 10'.
6—Tyler Hummer Screens, 3x5, 4x5.
4—3'x6' Sturtevant MV Screens, 2-deck.
1—5'x8' Niagara, 2-deck.
1—No. 32 Marcy Ball Mill.
1—No. 2 Sturtevant Ring Roll Mill.
5—6'x22' silex lined Tube Mills.
2—5'x22' silex lined Tube Mills.
1—3'x12' Hendy iron lined Tube Mill.

2—5x26', 5x30', 70"x35' double shell Ruggles-Coles Dryers.
12—Direct heat Rotary Dryers, 3x30, 4x30, 5x50, **5x60, 6x60,**
3—8'x60' Ruggles-Coles single shell Rotary Dryers.
2—P. & M. 8'6" and 9'6"x150' Rotary Kilns.
1—8'x125' P. & M. Rotary Kiln.
2—8'x110' Bonnot Rotary Kilns.
1—6'x60' Bonnot Rotary Kiln, with seals, cooler, hood, etc.

12—Jaw Crushers—No. 1436 Cedar Rapids; No. 1536 Universal; 18x24 Reliance; 24x36 Farrell, Buchanan; 36x42 Traylor, Farrell; 42x60 Farrell; 48x60 Allis-Chalmers; 48x72" Buchanan.
1—7x24" Sturtevant Jaw Crusher, all steel.
1—18"x18" Penna. S. R. Crusher.
1—24"x24" Jeffrey single roll Crusher.
1—18x36" McLanahan-Stone single roll Crusher, Texrope drive, 25 H.P. 3/60/440 motor.
1—36" Superior McCully Gyratory—all other sizes and types.
2—36x16, 20x14" Sturtevant Crushing Rolls; also other sizes, types.
1—24x20" Jeffrey type B Hammer Mill.
1—36"x36" Gruendler Hammer Mill, roller bearings.
2—6x12' Hardinge Iron Lined Rod Mills.
Just a partial list.

WE WILL BUY A SINGLE MACHINE OR COMPLETE PLANT.
What do you wish to sell? Send us details.
CONSOLIDATED PRODUCTS COMPANY, INC.
15-16-17 Park Row New York, N. Y.
Plant and Shops at Newark, N. J., cover 8 acres of ground.

FOR SALE
AT SACRIFICE PRICES

We carry full line of new and rebuilt U. S. Champion Tile Machines for producing excellent French and Spanish concrete tile roofing at lowest cost. Write us for particulars.

L. HANSEN COMPANY
2311 48th Street Terrace, Kansas City, Mo.

FOR SALE

1—6" Superior McCully Fine Reduction Crusher, with Tex-rope drive and extra eccentric, 90% new.

RADFORD LIMESTONE CO., INC.
EAST RADFORD, VIRGINIA

676' Worthington Duplex Air Compressor.
30" by 10' Feeder & Mag. Pulley.
Jaw Crushers: 9x16, 15x30, 24x36, 42x40, 10x30 & 5x12.
2 Fuller Kinyon 8" Type B Cement Pumps.
25 Ton & 40 Ton Steam Locomotives.
8 and 14 Ton Plymouth Gas Locomotives.
24", 30", 36" Conveyor Equipment.
18"x30' Steel Pan Conveyor.
8 Hummer, 4 Niagara Vib. Screens.
5 yd. Monighan Diesel Dragline.
4½x6 Mundy Steam Derrick Swinger.
22" by 80' Bucket Elevator.
Buchanan 30" Magnetic Pulley.
36x16 Kennedy Double Roll Crusher.
7x10 Double and 3 Drum Steam Hoists.
21-E Koehring Gas Cat. Paver.
1000 lb. Cap. Asphalt Pug Mill.
25 Ton Ohio Locomotive Crane.
85 Kw, 250 V-DC, 220 V-AC M.G. Set.
110 HP Single Drum Incline Hoist.
3—60 HP Electric Hoists.
15 Ton Steel 100' S.L. Derrick.
50 HP Clyde 3 Drum Elec. Hoist.
80—100 and 125 HP Firebox Boilers.

R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

An unusual offering!

6½ YARD MINING OR STRIPPING SHOVEL

Bucyrus 320-B 2200/4000 volt, 3 ph. 60 cycle, A.C.—250 volt D.C. Ward-Leonard control. 90 ft. boom and 58 ft. dipper stick. Built 1925 and used only two years. Very good condition. Located near Madisonville, Ky. Part cash terms if necessary.

IRON & STEEL PRODUCTS, INC.
Phone: HARrison 0163 Railway Exchange, Chicago, Ill.
"Anything so long as it contains IRON or STEEL."

PRICED RIGHT FOR QUICK SALE

Standard 5 ft. portable Mixer with Power Loader, Water Tank, Skip Loader and Fuller Engine. Chg. Pneu. NS-B Simplate Valve. Comp. 12x10 369 ft. displ. with lubricator, unloader, idler.

SCULLY-JONES & COMPANY
1919 S. Rockwell St. Chicago, Ill.

No. 8K Allis Chalmers Gyratory
42" Fuller Lehigh Mill
8' x 26' Allis Chalmers Tube Mill
4—Size A-3 Kent Mills 12¾" rolls
2—No. 66 Smidth Kominuters
3—6' x 45' and 60' Dryers or Coolers
42 x 48" Traylor Jaw Crusher—never used
¾ yd. Koehring Gas Crawler Cranes
16", 20", 36" Superior McCully Gyratorys
30 HP 2 Drum Diesel Engine Driven Hoist
100, 150, 300, 350 HP Diesel units.
600 HP 416 KW Busch-Sulzer Diesel.
40 HP 700 rpm 3/60/220 V. Meter.
2—168 KW Skinner Uniflow Gen. Sets.
20 ton Industrial Steam Locomotive Crane

MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St. St. Louis, Mo.
"Try Us Always When Buying or Selling"

RAILS "1 Ton or 1000"

NEW RAILS—5000 tons—All Sections—All Sizes.
RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
ACCESSORIES—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.
Buy from One Source—Save Time and Money. 'Phone, Write or Wire.

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

3—30 Ton Steel Stiff Leg Derricks—65'—75' and 90' Booms. Complete with Electric or Steam Hoisting Engines.
2—14x12 Ingersoll Rand Stationary Air Compressors—Type E B 1. Price $1500.00 each.
1—Model 100 Austin Gasoline Operated Trench Digger. Price $1000.00.
5—Single, Double and Three Drum Hoisting Engines—Electric—Gasoline and Steam.
50—Ingersoll Rand Type K—50 Jack Hammers—1¼" Steel—Like New. Price $75.00 each.
1—220 Cubic Foot Portable Gasoline Air Compressor. Price $600.00.
1—330 Cubic Foot Portable Gasoline Air Compressor—Like New. Price $1250.00.
1—Northwest Model 104 Combination Shovel and Crane. Price $3000.00.
1—Lima 1½ Yard Combination Shovel and Crane. Price $7500.00.
1—Bay City Combination Backhoe and Crane—Model 16 B—¾ Swing. Price $1250.00.
1—Byers Bearcat Crane—30' Boom—¾ Swing—Running Condition. Price $800.00.
1—Model 100 Cletrac Tractor used less than six months. Price $1000.00.
1—Model 60 Caterpillar Tractor with Bulldozer—Good Condition. Price $1000.00.
2—8" Morris Sand Pumps with Steam Engines—Good Condition. Price. $750.00 each.
2—12" Morris Sand Pumps with Steam Engines—Good Condition. Price $1000.00 each.
1—1½ Yard Lakewood Clam Shell Heavy Duty Bucket—Drilled for Teeth—Very Good Condition. Price $300.00.
Pneumatic Tools of All Kinds.
Chain Hoists—All Sizes.
Track Jacks—All Sizes.

BAKER AND GREENBERG
574 Hamilton Avenue Brooklyn, N. Y.
South 8—8823

GOOD EQUIPMENT
Real Values

GASOLINE LOCOMOTIVE
Whitcomb 3½ Ton, 36" Ga.
Powered by Fordson Tractor Motor

PORTABLE PUMP OUTFIT
Barnes 3½ x 6 Triplex Horizontal
Direct Connected to Hercules Motor

REVOLVING, SHAKER, OR VIBRATOR SCREENS

New & Used Rails—Pipe—Pumps
Electrical Equipment of All Kinds
We Solicit Your Inquiry

J. ROSENBAUM & SON
Centerville, Iowa

FOR SALE

1—9"x10" Clyde double cylinder, 3-drum steam hoist with boiler.
1—7"x10" American double cylinder, 2-drum steam hoist, ASME boiler 125 lbs.
1—7"x10" Lambert double cylinder, 2-drum steam hoist, ASME boiler 125 lbs.
1—1½-yd. Sauerman Crescent Type Drag Scraper Bucket, manganese teeth.
1—1-yd. Sauerman Crescent Type Drag Scraper Bucket, manganese teeth.
1—9"x16" Indiana Jaw Crusher.
1—8" Holtz sand and dredging pump—belt driven.
1—6" Holtz sand and dredging pump—belt driven.

We also have a large stock of electric motors, turbines and engine driven generator sets, boilers and power plant equipment. At all times in the market for good used equipment. Send us your inquiries.

TENNESSEE MACHINERY COMPANY
121 3rd Ave., South Nashville Tenn.

GEORGE HAISS MFG. CO., Inc. **HAISS** **Park Ave. and 143rd St. New York**

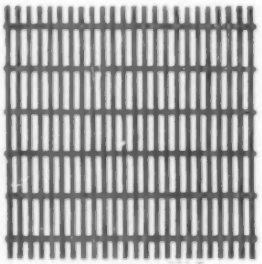
Send me full details and prices on equipment checked

FACTORY REBUILT CLAM SHELL BUCKETS
☐ 1—Owen ⅝ yd. digging bucket with teeth.
☐ 1—Haiss 1-yd. Rehandling Bucket.
☐ 1—Haiss ¾ yd. Rehandling Bucket.
☐ 1—Blaw Knox ¾ yd. Dread Naught type Bucket with teeth.
☐ 1—Hayward 1½ yd. Type "E" Bucket.
☐ 1—Haiss ½ yd. HiPower Digging Bucket. Rented one month.
☐ 1—Williams 1 yd. Rehandling Bucket.
☐ 3—Hayward 1½ yd. SNOW Buckets.

FACTORY REBUILT TRUCK LOADER
☐ 1—Haiss 2-yd. a min. Creeper Truck Loader.

Name .....
Address .....

Classified Ads—$4.00 per column inch. Positions or Help Wanted—$1.00 per column inch, payable in advance.



Rolled Slot

ALLOY No. 2

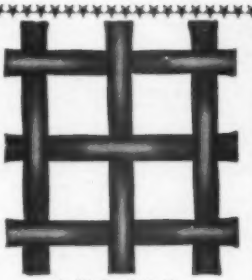
STAR PERFORMERS

CLEVELAND SCREENS are star performers—returning larger capacities, increased profits and more accurate separations at lower cost. Cleveland Screens save money with the initial investment because, if they are made of the longer-wearing, wear-resisting ALLOY NO. 2—Cleveland Screens stay on the job long after ordinary screens would have been replaced.

★ ★

THE CLEVELAND WIRE CLOTH & MFG. CO.

3574 E. 78TH STREET . . . . . CLEVELAND, OHIO

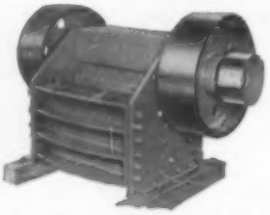


2 Mesh .162 Ga.

MORE PROFITS FOR YOU

GRUENDLER

CRUSHERS and PULVERIZERS



The old reliable result-producers known the world over for their truly remarkable performance under the most exacting service conditions.

Gruendler crushers and pulverizers prepare rock for cement mills or aggregate at extremely low cost per ton. Capacities from 10 tons to 4000 tons daily. All steel construction — low upkeep cost.

Also Hammer Mills, Ring Mills, Roll Crushers, Jaw Crushers, Screen and Conveying equipment of most rugged design for long life. Rock and gravel crushing screens and washers.

Equipment for Both Fixed and Roadside Plants.

GRUENDLER CRUSHER & PULVERIZER CO.

Since 1885

RP., 2915 N. MARKET ST. ST. LOUIS, MO.

GYREX SCREENS, ROBINS-ORO FEEDERS AND BELT CONVEYORS ARE MONEY SAVERS.

ROBINS CONVEYING BELT COMPANY

15 Park Row, New York

37 W. Van Buren St., Chicago

MATERIAL HANDLING ROBINS EQUIPMENT

Send for descriptive Bulletins.

DIXIE HAMMERMILLS

DIXIE

NON-CLOG

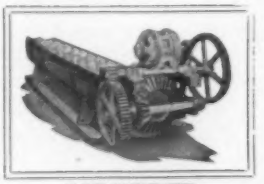
HAMMER MILLS

Your best 1936 bet. More production—more profit—lower operating and maintenance cost. No reduction problem can stump the DIXIE, which handles wet, sticky material direct from the quarry without clogging the feed. The special moving breaker plate gives you twenty-six times the wearing area of any standard type of breaker plate and reduces material to any desired size in a single operation with absolute uniformity. 40 sizes for any capacity—Primary—Secondary or Fine Reduction. Write.

DIXIE MACHINERY MFG. COMPANY

4209 GOODFELLOW AVE., ST. LOUIS, MO.

Why ship dirty stone when it can be made clean easily and so economically?



SCRUBBER

This scrubber will do the good work.

State Capacity Required!

LEWISTOWN FOUNDRY & MACHINE CO.

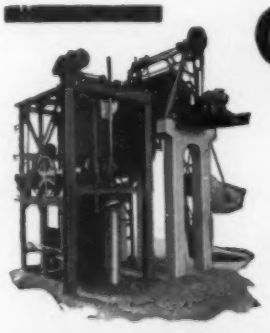
Mfrs. of Sand Crushing, Grinding, Washing and Drying Machinery

LEWISTOWN - - - - - PENN.

ROL-MAN

Rol-Man Rolled, True (11% to 14%) Manganese Steel has practically double the strength and abrasion resistance of cast manganese steel, ten times the "effective strength" of mild steel and three and a half times that of heat treated nickel steel. Send for this 32 page catalog No. 4R. No obligation.

MANGANESE STEEL FORGE CO. • Castor Ave. & Bath St. • PHILADELPHIA



CONCRETE PIPE EQUIPMENT

MACHINES

PIPE MOLDS

(New and Used)

All equipment necessary for the pipe manufacturer

UNIVERSAL CONCRETE PIPE CO.

COLUMBUS, OHIO

"E. C. A. Rebuilt" Quarry and Gravel Plant Equipment

AIR COMPRESSORS

Portable and stationary, belt, with elec. or gas power, sizes from 21 cu. ft. to 1,000 cu. ft.

BINS

8—Bins: 2—Blaw Knox 118 ton; 1—Blaw Knox 117 ton with weigh batchers; 1—Butler 75 yd. with weigh batchers; 2—Johnson 76 yd. and 54 yd.; 2—Blaw Knox 72 ton with or without weigh batchers, all 2 compartment.

BUCKETS

1—¼-yd. Hayward Class "G" clamshell.

34—Williams, Blaw Knox, Owen clamshell buckets, all sizes and types.

5—Dragline buckets; 1—Northwest 1⅝ yd., 2—Page 1½ yd., 1—Omaha 1½ yd., 1—Blaw Knox 1 yd.

CARS

Large list including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd.

16—2 yd. 36 inch ga. Continental 2-way wood body dump cars.

CRANES AND DRAGLINES

1—Koehring Model 501 dragline, Serial No. 1070, 45' boom, 1¼ yd. bucket.

1—Northwest Model 104, Serial No. 2079, 45' boom, 1¼-yd. bucket.

2—Northwest Model 105, Serial No. 756 and 2053, 60' boom, 1-yd. bucket.

1—Link Belt Model K-1 crane, shop No. 1024, 50' boom, 1-yd. bucket.

1—Osgood heavy duty dragline, Serial No. 2069.

1—Industrial Brownhoist type CC, No. 5071, 30' boom, ½-yd. bucket.

1—Byers Bearcat crane, Model 26, Ser. 20474, half circle swing, ½-yd. bucket.

1—Erie type B-2, Serial No. 2900 steam crane, 40' boom, 1-yd. bucket.

CRANES (Locomotives)

5—Locomotive cranes; sta. ga. 30 and 25 tons; Ohio, Browning, American, Industrial.

CRUSHERS

1—Symons coarse cone crusher, size No. 5½, SU No. 521.

1—Set P & M crushing rolls, size 42"x16".

1—Allis-Chalmers, Style N, No. 6, gyratory No. 7755.

1—Allis-Chalmers Gates No. 5, Ser. 5331.

2—McCulley No. 3 gyratory.

1—Carroll 24"x36" jaw, manganese fitted.

1—Champion size No. 6, 12"x26", Ser. No. 1075.

1—Allis-Chalmers Blake type, size 10" x20", manganese fitted, Ser. No. 3163.

1—Champion size No. 4, 9"x15", jaw.

LOADERS

2—Barber Greene Model 42-A, self feeding loaders, cap. 1¾-yd. per minute.

DRILL (CORE)

1—Sullivan Model 21 Diamond core drill with hyd. feed and gasoline power. New, never used.

LOCOMOTIVES

32—Gasoline locomotives, from 20-ton to 2-ton, std. ga. 36" and 24" ga.

2—Plymouth std. ga. gas locomotives; 1—20 ton Model HL No. 2351; 1—12 ton Model JLB No. 2308.

PUMPS

4—Belt Driven Dredge pumps. 1—6" Morris; 1—6" Morris manganese; 1—6" Erie; 1—4" Morris.

2—Dayton Dowd 5" suct. 4" disc. centr. pumps V-belt drive to 100 HP Northwest oil engines, cap. 600 GPM at 450 ft. head.

SHOVELS

1—Lorraine 75-D 1¼-yd. shovel No. 4653 and with pull shovel attachment.

1—Osgood heavy duty Serial 2069, 1-yd. gas shovel.

3—Link Belt shovel attachments for K-55, K-44, K-42, K-38, K-2 machines.

EQUIPMENT CORPORATION OF AMERICA

PHILADELPHIA — P. O. Box 5471, Kingessing Sta. — Phone Granite 7600

CHICAGO — 1119 S. Washtenaw Ave. — Phone Nevada 2400

PITTSBURGH — P. O. Box 933 — Phone Federal 2000

Good Equipment—Priced Right

1—Northwest No. 7 crane, 1⅝ yd. cap. 70' boom.
1—Lima comb. 1½ yd. comb. shovel-crane.
1—Lorain comb. 1¼ yd. shovel-crane.
1—Lorain shovel 1¼ yd. cap.
1—Byers crane 1 yd. cap. Model 100.
2—Osgood steam shovels, heavy duty 1¼ yd. cap.
1—Browning truck crane on Mack truck.
2—Locomotives, gas, 20 tons, 36" ga. Whitcomb.
1—Locomotive, gas, 20 tons, 36" ga. Vulcan.
1—Locomotive, gas, 4½ tons, gas 36" ga. Vulcan.
25—Cars, 5 yds. two way dump, 36" ga.
10—Cars, 2 yd. steel V dump, 36" ga.
1—Batcher Plant, Butler, 3 compartments—125 yds. bin with weigh meters, cement bin, screw conveyor, complete.
Conveyor belt systems, 20", 22", 30" belts, idlers, troughing rollers, take ups, etc.
50—Rock drills, DCR-23, X49, X59, S70, others.
10—Concrete breakers, pneumatic.
30—"BARRE" carving tools, BL, CL, DL.
1—Bucket elevator, 32'.
1—Compressor, 1200 cfm. I. R., type PRE-2 electric.
1—Compressor, 900 cfm. Worthington, Diesel driven.
1—Compressor, 514 cfm. short belt drive, electric.
1—Screen, Telsmith vibratory, 4'x12', 5 h.p. motor.
1—Storage bin, 500 yds., steel portable 4 compts.
5—Trucks, White 5 yds. dump, motor.
2—Derricks, steel stiff leg, 15 tons cap. 100' booms.
4—Derricks, steel guy, 7½ tons cap. 75' booms.
Buckets, all kinds. Ask for special list. Hoists, boilers, motors, steel hoisting blocks.

Send Us Your Inquiries

RICHARD P. WALSH CO.

30 Church St. — NEW YORK CITY

Jaw Crushers—2"x6" up to 66"x84".
Crushing Rolls—12"x12" up to 54"x24"—Gyratory Crushers—No. 3 up to 42".
Ring Roll Mills — No. 0 and No. 1 — Swing Hammer Mills.
Rotary Fine Crushers—No. 1, No. 1½, No. 2.
Direct Heat Rotary Dryers—4'x30', 5'x50', 5½'x35', 6'x60', 3½'x25', 8'x50'.
Semi-indirect Heat Dryers, 4'x30', 4½'x26', 5'x20' and 8½'x75'.
Cement Kilns—8' up to 9½' diameter.
Hardinge—Marcy & Fuller—Lehigh Mills.
Raymond Mills—No. 00, No. 0, No. 1 roll.
1—New 60x84 Jaw Crusher.
Tube—Rod and Ball Mills—4' to 8' diameter.
1—6'x22" Hardinge ball mill.
New dryers made for all purposes.
One No. 27 I-R oil furnace for drills.

W. P. HEINEKEN

95 Liberty St., N. Y. — Tel.: Barclay 7-7298

BARGAINS

8—20-yd. All Steel std. ga. WESTERN Air Operated Dump Cars—Built 1929.
2—RUGGLES Class XA-14-90"x50' Dryers. Complete. New 1930.
2—RUGGLES Class A-11 72"x45' Dryers.
4—FULLER Mills, 42". Gear Drive.
2—6" Type "E" FULLER Kinyon Pumps.
8—No. 80 BAILEY Feeders. Complete.
1—4'x8' NIAGARA Double Deck Screen Texrope Drive.
3—No. 11 Type RB Blowers.
1—Complete Multiclone Dust Collector. New 1935—four units.
2—DINGS Magnet Pulleys.
2—DINGS No. 2 Magnetic Separators.
1—MYER-WHALEY No. 4 Shovel.
1 set 24" UNITED Iron Wks. Crush. Rolls.
1 set 36" UNITED Iron Wks. Crush. Rolls.
1—No. 32 Raymond Bros. Impact Pulverizer.
1—8K-4 Gates Gyratory Crusher, 8x20".
2—Pennsylvania size S-7 Hammer Crushers.

IRON & STEEL PRODUCTS, INC.

Railway Exchange — Chicago, Ill.

"Anything so long as it contains Iron or Steel"

PRICED FOR QUICK SALE

200 Staple post mold forms for making concrete lime posts and full set corner and brace forms.

THE GALIEN CONCRETE TILE CO.
GALIEN, MICH.

Gyratory Crushers: 5K, 6K, 8K Gates, 12" Traylor Bulldog, No. 6-BH Traylor.
Jaw Crushers: 7½x13 to 66x84.
Rotary Kilns: 8x110 and 6x60.
Sturtevant Balanced Rolls: 30x16, 20x14 and 16x10.
Other Rolls 42x24, 42x16, 36x16, 30x14 and 24x14.
Hammermills: No. 5040 and 5024 Dixie Mogul, 24x12 Jeffrey A, No. 3 Williams Helix Seal.
3'0x36" Hardinge Conical Mill.
Rotary Dryers: 4'6"x30'0" Lehigh and 4'0"x 20'0" Ruggles Coles.
200 K.W. Motor Generator Set.
450 H.P. Diesel Generator.
1000 GPM Fire Pump, Electric.
Rod Mills 3'x10', 5'x12' and 24"x54" Marcy.
¾ and 1¼ yd. Marion A.C. Elec. Shovels.
Tube Mills: 5x22 and 5½x20.
Austin Style 100 Trencher.
Galion EZ Lift Motor Grader.

TIDEWATER EQUIP. & MACHY. CORP.

875 Sixth Ave. — New York, N. Y.

1—35-ton McMyler Locomotive Crane.
1—30-ton Whitcomb Gas Locomotive.
3—12-ton Whitcomb Gas Locomotives.
1—¾-yd. Osgood Comb. Shovel-Crane.
1—½-yd. Byers Comb. Shovel-Crane.
5—Clamshell Buckets, ⅛ to 1½-yd.
1245 ft. Ingersoll-Rand Compressor.
450 ft. Ingersoll-Rand Compressor.
1—100 HP. Elec. Dragline Hoist, 2-yd. bkt.
5—Jackhammers.
1—4½x6 Swinging Engine.
1—Barber-Greene 42 Bucket Loader.
1—8-ton 36 ga. Plymouth Locomotive.
6—5 yd. 36" ga. Dump Cars.

J. T. WALSH

Brisbane Building — Buffalo, New York

MODERN EQUIPMENT

15—Belt Conveyors, 30—300'.
1—701 Lima Gas Shovel.
1—¾ yd. P. & H. 206 Shovel.
6—12 & 14 ton 36" gauge gas Locomotives.
3—2 ton 36" Gauge gas Locomotives.
30—Western 4 yd. and 6 yd. Dump Cars.
2—807' Ingersoll-Rand XCB Compressors.
1—1052' Ingersoll-Rand XCB Compressor.
1—4'x12' Tel-Smith Vibrating Screen.
1—No. 49 Kennedy Gyratory Crusher.
1—10"x20" Climax Jaw Crusher.
1—2200' Cableway, complete.
1—13"x18" McCulley Crusher.
1—125 H.P. Atlas Diesel.
1—125 H.P. 6 cyl. Hall-Scott Gas Engine.

COAST-TO-COAST STEEL & EQUIPMENT CORPORATION

101 West 31st St. — New York, N. Y.

Construction Equipment — *Industrial Equipment*

H. O. Penn Machinery Co.

INCORPORATED

140th Street and East River, New York City

Demand for Diesel Tractors has made it possible to save you money in offering the following

2—"CATERPILLAR" rebuilt Sixty Gas Tractors, equipped with LaPlant Choate Bulldozers

2—"CATERPILLAR" rebuilt Thirty Gas Tractors, equipped with LaPlant Choate Bulldozers

1—"CATERPILLAR" 50 Diesel rebuilt Tractor with LaPlant Choate Bulldozer

The swing is definitely toward new Marion clutch type shovels. We have and offer subject to prior sale at bargain prices

1—SPEEDER ½ Yard equipped with shovel—completely rebuilt
1—KOEHRING 301 equipped with shovel or crane boom attachment, good condition
1—LINK BELT K-1 with 50 ft. boom—good operating condition
1—Model 75B LORAIN 1¼ Yd. equipped with shovel.
1—LINK BELT Model K-35 equipped with 50' clamshell and dragline fairleads, trench hoe (almost new) and 1 Yd. shovel attachment

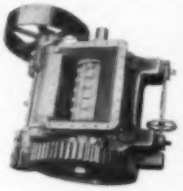
We have all types of used construction equipment available—write or 'phone for complete list

HEAVY DUTY
DRYERS
Rotary Type

DIRECT FIRED
SINGLE SHELL
and
INDIRECT-DIRECT HEAT
DOUBLE SHELL

ASK WHAT WE HAVE DONE FOR OTHERS

The C. O. BARTLETT & SNOW Co.
6194 Harvard Avenue • • Cleveland, Ohio



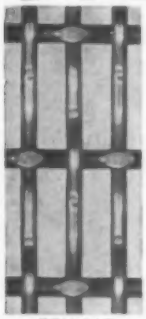
McLANAHAN
EQUIPMENT

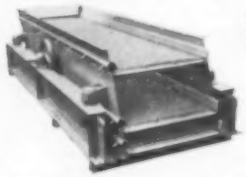
CRUSHERS
Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

SCREENS
Complete portable, semi-portable and stationary crushing, screening, and washing plants for different capacities of any materials.

McLanahan & Stone Corp.
Established 1835
HOLLIDAYSBURG, PENNSYLVANIA

TYLER SCREENS
CIRCLE-THROW
MECHANICALLY AND
ELECTRICALLY-VIBRATED





and Woven
Wire Screen
In all Meshes
and Metals
Scrubbers
and
Dryers

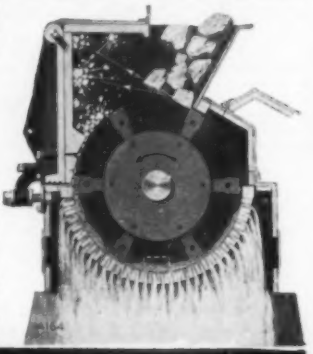
TON-CAP

THE W. S. TYLER COMPANY
3623 Superior Avenue Cleveland, Ohio

Jeffrey Type B
Swing Hammer
Pulverizers

The Type B is used for the heavy work . . . Type A for lighter work. Either will give you dependable day-in and day-out service. Call on Jeffrey if you want the best in Reduction Machinery. A type and size for every purpose.

Catalog No. 550-H



The Jeffrey Manufacturing Co.
935-99 N. Fourth St., Columbus, Ohio

MANGANAL
Trade Mark Reg. U. S. Patent Office
11 to 13½% Nickel Manganese Steel
U. S. Patents 1,876,738, 1,947,167 and 2,021,945.

Welding Electrodes,
Applicator Bars, Wedges
for Reclaiming 11 to 14% Manganese Steel Parts
Get them from your regular jobber.

SOLE PRODUCERS
STULZ-SICKLES COMPANY
142 LAFAYETTE STREET NEWARK, N. J.

SCHAFFER
POIDOMETERS

Recognized and preferred in the foremost plants throughout the rock products industry for the feeding of material by weight, in a steady, uniform, constant stream—weighing and registering the total amount of material it handles.

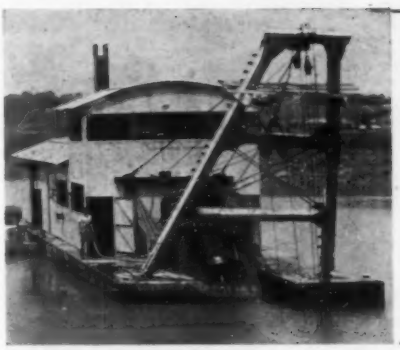
EFFICIENT — ACCURATE — ECONOMICAL
Write for Catalogue No. 2

Schaffer Poidometer Co.
2828 Smallman St., Pittsburgh, Pa.

COMPLETE HYDRAULIC DREDGES

SAND AND GRAVEL DREDGING PUMPS
AGITATING MACHINERY
DREDGE HOISTS
STEEL HULLS • PONTOONS
PIPE LINE ACCESSORIES

HETHERINGTON & BERNER, INC.
701-745 KENTUCKY AVENUE INDIANAPOLIS, IND.



For Sale

2 — 26'0"x76'0"x5'0" — 15" Steel Dredge Boats, complete, equipped with 60'0" Str. Steel Ladder, Rotary cutter, 15" Amsco Manganese Dredge Pump, Marion 5 Drum electric Hoist, Marine Cable, solonoid brake, grids, priming pump, 2 — 60'0" spuds, overhead lever bank, 20'0" A Frame, 300 and 350 HP Electric Motors 2200 Volt, Manganese Stone Box, 15" Manganese Elbows, long and short radius, and complete in every detail. Additional 35'0" Structural Steel Ladder.

LOCATED CENTRAL INDIANA

ELWOOD SALES & MFG. CO. Lafayette, Indiana

FOR SALE

75-Ton Baldwin six wheel switcher with separate tender, 21x26" cylinders.

72-ton American six wheel switcher with separate tender, 20x26" cylinders.

62-Ton Baldwin six wheel switcher with separate tender, 19x22" cylinders.

62-Ton Porter six wheel switcher with separate tender, 19x26" cylinders.

52-Ton Porter six wheel switcher with separate tender, 18x24" cylinders.

55-Ton Baldwin four wheel saddle tank, 18x24" cylinders.

50-Ton American four wheel saddle tank, 16x24" cylinders.

40-Ton American four wheel saddle tank, 14x22" cylinders.

Complete stock list on request.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
BIRMINGHAM, ALA.

SHOVELS—STEAM

2—1¼-yd. Osgood Caterpillar Shovels

Guaranteed Shop Reconditioned

ANY DEMONSTRATION

Boilers passed for High Pressures and are NATIONAL BD. A. S. M. E. MASS. and OHIO Std.

—Priced Right to Move—

R. P. WALSH EQUIPMENT COMPANY
827 E. 9th Street **New York City**

FOR SALE

1—50 H.P., G. E., 333 rpm. to 1000 rpm. BTA motor, 3 phase, 440 volts, 60 cycle, complete with brush shifting control.
1—75 H.P., G. E., 575 rpm., slipring motor, 3 phase, 440 volts, 60 cycle, complete with rails, drum controller, variable speed resistance and contactor.

McHUGH ELECTRIC COMPANY
211 W. Eighth St. **Wilmington, Delaware**

FOR SALE

3 — 24" Link-Belt Shaw Sand Classifiers
In Excellent Condition

TERRE HAUTE GRAVEL COMPANY
Terre Haute, Indiana

Model 70 Marion Steam Shovel 2½ yard bucket, excellent condition, sell cheap, can be seen at Osborn, Ohio.

Wabash Portland Cement Co.
DETROIT, MICHIGAN

FOR SALE

Lime Hydrating Equipment complete, like new.
No. 3 & No. 5 Williams Hammermills. Also others.
7" Newhouse reduction Crusher with motor.
7" Newhouse reduction Crusher with motor.
6" & 8" ty. "B" Fuller-Kinyon Cement Pumps.
2½ yd. Diesel Shovel Dragline, new 1935.
3 yd. Electric Shovel, crawler mounted.
30 ton Ohio Loco. Crane, new boiler, etc.

Alex T. McLeod, 7229 Rogers Ave., Chicago, Illinois

TRAMWAY

(Aerial) Trenton Bleichert Automatic Dump Type, new in 1922, 1⅝" locked coil cable 2800' long, 32 carriers 1500 lb. capacity. All equipment in excellent condition, motors, etc. Has conveyed only 650,000 net tons. Capacity about 600 tons daily. Mine exhausted, reason for selling.

PERRY HILLS COAL COMPANY
Punxsutawney, Pa.

14 cars like new, 8 Easton, 6 Koppel, 36" gauge, 2 cu. yd. capacity, "V" shaped, all steel, heavy duty. Complete stock all types cars, machinery, and equipment. Also all sections new and relaying rail and portable track, 12 lbs. to 130 lbs. Wire or write for prices.

M. K. FRANK
480 Lexington Ave., New York City **450 Fourth Ave., Pittsburgh, Pa.**

FOR SALE

1—Triple deck and 2—double deck 4' x 8' Mogul type Niagara vibrating screens, equipped with new style tension decks, first class guaranteed condition.

CHURCH ENGINEERING COMPANY
Chamber of Commerce Bldg., Cincinnati, O.

2 New Jigger 3-Deck 3x8 Vibrating Screens.
9 Hummer Elect. Vibr. Screens, 1 & 2 Deck.
Hummer Screen Generators, 8 KVA, 110-volt, complete with panel board.
Deister Plat-O 3x6' double deck Vibr. Sreen.
Conveyor Idlers & Pulleys, 16" to 30" belt.
Belt Conveyor Trippers, from 16" to 30".
14" Belt Conveyor Equipment, 200' long.
Cont. Belt Elevator 60' high & 24" buckets.
Cont. Belt Elevator 60' high & 36" buckets.
Link-Belt Enclosed Chain-Bucket Elevator, 35'x12".
Jeffrey Enclosed Chain-Bucket Elev. 35'x8".
Clamshell Mat'l Buckets, ⅝, 1 1½ yards.
Haiss Digging Bucket Loader, on wheels.
Jeffrey No. 3 Combination Jaw Crusher and Hammermill.
Farrel Jaw Crusher, 42x40" type E.
Kennedy 37 Gyratory Crusher, 50 HP. Synchronous Motor.
Acme 10"x42" Jaw Crusher.
Sturtevant No. 0 Ring Roll Pulverizer.
Revolving Stone Screen, 4'x20', on Trunions.
LeCourteney Centrifugal Electric Pump, 150 GPM and 150' Head.
Goulds Centrifugal Electric Pump, 1000 GPM, with 22 HP motor.
Fairbanks-Morse Centrifugal Belted Pump, 375 GPM and 77' Head.
Morris Standard 8" Dredge Pump, no power.
Johnston 50 HP. Loco. Boiler, 125 lb., skids.
Easton Flat Std. Gauge Car, 6x8' platform.
2 Gasoline Locomotives, 36"-g, 4 & 6 ton.
Mundy 2-Drum Hoist, 25 HP. slipring motor.
Mundy 2-Drum Hoist, 35 HP. Buda Gas engine.
Clyde 2-Drum Hoist, 100 HP. slipring motor.
I. R. Belted XCB Air Compressor, 676 CFM.
Gardner-Denver portable air compressor, 160 ft.
Schramm compressor, 120', 15 HP., electric.
Hayward 2 yard Clamshell material bucket.

G. A. UNVERZAGT
15 Park Row **New York City**

WHEEL PRESS

Several desirable sizes of hydraulic presses. Tell us of your requirements.

THE INDUSTRIAL EQUIPMENT CORP.
Machinery Dealers
Warehouse, Carnegie, Pa. **P. O. Box 1647, Pittsburgh, Pa.**

FOR SALE

1—Car Puller, Gifford Wood Capstain type.
2—Clamshell Buckets, 1⅛-yd. power wheel type.
1—Hammermill KB2, manganese screens.
1—24" Symonds Disk Crusher, belt drive.

EQUITY EQUIPMENT CORP.
41 Park Row, N.Y.C. Tel. Cort. 7-1250

Four Worthington-Laidlaw Feather Valve Duplex Air Compressors

24x18x14—with Overhead Inter. Coolers, Piston Disp. 1860 C.F.M. Disc Press. 100 lbs., 200 R.P.M. Dir. Conn. to 350 H.P. G. E. Synch. Motors, 2200 V. 3 ph. 60 cy. Complete with Control.

A. C. MOTORS
3 Ph. 60 Cy.

H.P.	Make	Type	Volts	Speed
850	G. E.	Synch.	2300/440	720
600	A1. Ch.	Synch.	440	450
500	G. E.	Synch.	440	1200
450	West.	Synch.	440	257
450	West.	S1. Rg.	2300	875/700
400	G. E.	S1. Rg.	2300/550	390
400	West.	S1. Rg.	2300/550	290
400	G. E.	S1. Rg.	440/220	505
400	West.	S1. Rg.	2300	514
400	G. E.	S1. Rg.	2300	885
300	A1. Ch.	S1. Rg.	2300/550	585
250	G. E.	S1. Rg.	4000/2300	257
250	West.	S1. Rg.	440/220	585
250	F. Morse	S1. Rg.	2300/550	1200
225	El. Machy.	Synch.	4150/2300	450
220	G. E.	Synch.	2300	900
200	West.	Synch.	440	514
200	West.	Synch.	2300/550	1800
200	West.	S1. Rg.	2300	870
200	West.	S1. Rg.	440/220	900
150	West.	Synch.	4000/2300	1800

BELYEA CO., INC.
141 W. 18th St. **NEW YORK, N. Y.**

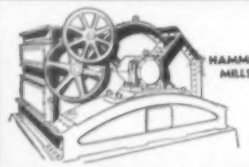
CARS

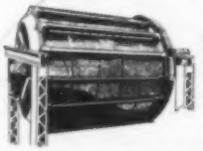
12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. St. Louis, Mo. **101 West 31st St. New York**

Marion 37 Electric Cat. Shovel, full rev., 1¾ yd.
Northwest Models 7 & M crane-drags, 1¼ & 1½ yd.
Industrial 35-50 ton capacity Loco. Crane.
Monighan 3W Diesel Drag., 75' boom, 3 yd. bucket.
Sauerman 1 yd. Drag Scraper hoist. Others ⅜-5 yd.
Hammermills—Williams No. 4 & 5 Jumbo, No. 3 Jr., & No. 9 Universal; also Dixies inc. 150 & 100 HP. motors.
Crushers—4' Cone, 7" & 6" A-C reduction, 12" Telsmith primary; 66x84-24x36-9x36-8x24 & 9x16 Jaw.
Buckeye ⅝ yd. Crane & Drag., full revolving.

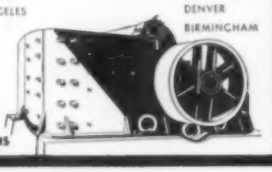
James Wood, 53 W. Jackson Blvd., Chicago





PENNSYLVANIA CRUSHER CO.

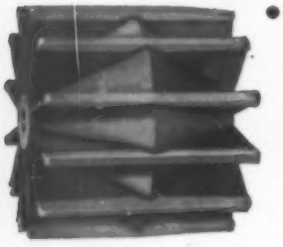
NEW YORK
PITTSBURGH
CLEVELAND
PHILADELPHIA
LOS ANGELES
CHICAGO
DENVER
BIRMINGHAM



Perforated Metals — Screens of All Kinds — For Sand, Gravel, Stone, Etc.

MATERIAL IN STOCK
PROMPT SHIPMENT

CHICAGO PERFORATING CO.
2427 to 2445 West 24th Place
Tel. Canal 1450 CHICAGO, ILL.



CONVEYORS LAST LONGER

where SPROUT-WALDRON Wing Pulleys are used. The same is true of your Elevator belts.

Material conveyed cannot lodge between belt and pulley to cut your belts.

Interchangeable with standard pulleys.

Write for catalog.

SPROUT, WALDRON & CO., INC.
1221 SHERMAN ST., MUNCY, PA.
Elevating, Conveying and Transmission Equipment

MANGANESE STEEL CASTINGS

—FOR—
CRUSHERS
PULVERIZERS
ROLLS
SCREENS

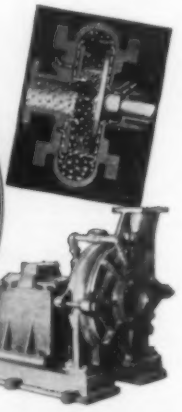
—FOR—
SHOVELS
DREDGES
CRANES
CONVEYORS

The Frog, Switch & Mfg. Co.
Established 1881 Carlisle, Pa.

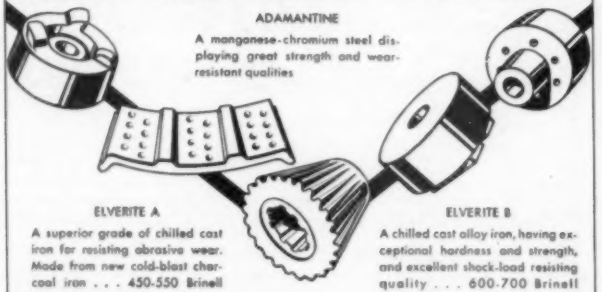
HYDROSEAL DREDGE PUMP

Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request.

ALLEN-SHERMAN-HOFF CO.
223 South Fifteenth Street
Philadelphia, Pa.



WEAR RESISTANT CASTINGS



ADAMANTINE
A manganese-chromium steel displaying great strength and wear-resistant qualities

ELVERITE A
A superior grade of chilled cast iron for resisting abrasive wear. Made from new cold-blast charcoal iron . . . 450-550 Brinell Hardness.

ELVERITE B
A chilled cast alloy iron, having exceptional hardness and strength, and excellent shock-load resisting quality . . . 600-700 Brinell Hardness.

BABCOCK & WILCOX
85 LIBERTY ST. NEW YORK, N.Y.

HAYWARD BUCKETS

GOOD FOR YEARS OF HARD SERVICE

A HAYWARD Bucket is an investment, not a gamble. It helps you make a profit on every job.

THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

HERE IS A REAL SCREENING DATA BOOK FREE . . . 36 PAGES OF CHARTS, TESTS, SELECTIVE THROW, APPLICATIONS

YES send me your new BOOK "data on Controlled Vibration and Screen Efficiency."

FIRM_____

NAME_____ Title_____

Address_____

City_____ State_____

PRODUCTIVE EQUIPMENT CORP.
4600 SOUTH KEDZIE AVENUE CHICAGO U.S.A.

USED EQUIPMENT

USED EQUIPMENT BARGAINS

1—O&S ¾-yd. Crane, 35' boom.....$1000
1—Hayward 12 cu. ft. Orange Peel Bucket 375
1—Blaw-Knox 200-ton 3-compartment bin with batchers..... 2500
11—5-yd. Continental & Western 36" gauge side dump cars, each..... 100
1—Sullivan 110' Portable Air Compressor 700
1—Sullivan 230' Portable Air Compressor 1000
1—6-ton Whitcomb 24" gas loco..... 350
1—Barnes 4" Double Diaphragm Pump 250

All items are offered F.O.B. St. Louis, in good operating condition and subject to prior sale.

O. B. AVERY COMPANY
1325 Macklind Ave. St. Louis, Mo.

WELDING OUTFITS

$6.00 to $72.00
EASY TERMS
MONTHS TO PAY

SUPERIOR
OXY-ACETYLENE MACHINE CO.
Hamilton, Ohio

BLAST HOLD DRILL

Model 29 Bucyrus-Armstrong Electric, Full Crawler, Four Years Old, Used Very Little, Excellent Condition.

FRANK SWABB EQUIPMENT CO.
Hazleton, Pa.

PRICED FOR QUICK SALE

1—24"x36" P & M Jaw Crusher.
1—Whitcomb 36" gauge 4 ton gasoline Locomotive.
5000 ft. Cable, ¾", ⅝", six strand, seven wire.
1—single drum gasoline driven Hoist with 8 HP. Nova Engine.
3—Gruendler, Williams ball bearing Swing Hammer Mills.
1—4½'x12' Abbe Tube Mill.
1—Lambert steam driven Hoist.
12—36" gauge Dump Cars.
1—Haiss gasoline driven Portable Conveyor.
2—6"x8" Triplex Pumps.

STEIN-BRILL CORPORATION
183 Varick Street
New York, N. Y.

FOR SALE

Polysius Size 14 Zet Crusher
12"x12"x10"
50 Tons per Hour
With G.E. 100 H.P. Supersynchronous Motor for Operating Crusher.

Also 1—100 H.P. Vulcan No. 86 Single Drum Geared Electric Hoist, Completely Equipped with 100 H.P. G.E. Motor.

This Equipment has NEVER Been Used.

Address Box No. 771, care Rock Products, 205 W. Wacker Dr., Chicago, Illinois.

FOR SALE

12—5-yd. 36" ga. Western Dump Cars.
6—2-yd. 36" ga. Koppel Steel V Dump Cars.
4—1½-yd. 36" ga. Insley Steel V Dump Cars.
2—3½-ton 36" ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg., Chicago
Railway Exchange Bldg. St. Louis, Mo. **101 West 31st St. New York**

FOR SALE

6K Gyratory Crusher. Good as new. Crush from 13" to 1½". Rebuilt with $1,300.00 worth new manganese parts. For quick sale $1,500.00 f.o.b. our sidetrack. **J. F. FITZPATRICK, P. O. Box 329, Worcester, Mass.**

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

USED EQUIPMENT WANTED

WANTED

One—1¾ yard bucket for Marion No. 37 shovel. We prefer Bale type Bucket. Quote best cash price—advise location and condition. Reply to:

Box 780, care Rock Products
205 W. Wacker Drive. Chicago, Illinois

POSITIONS WANTED

CONCRETE BLOCK, MASON CONTRACtor desires correspondence with block manufacturer who desires a market for his product, by connection with the above, who will submit attractive figures for setting, and who will cooperate with the sale of the product. Box 732, Rock Products, 205 W. Wacker Drive, Chicago, Ill.

POSITION WANTED AS SUPERINTENDent with a progressive stone company. 20 years' experience operating limestone quarries and crushing plants; familiar with all modern equipment; efficient handling of labor with record of low cost of production; qualified to assume full charge of any size plant or plants; unquestionable reference. Open for engagement. Address Box 746, care Rock Products, 205 W. Wacker Dr., Chicago, Ill.

POSITION WANTED AS SUPT. 25 YEARS experience operating lime plants, crushing and pulverizing quarrying in all kinds of stone. Good executive. Can handle anything in the stone industry. An exceptional opportunity to secure a man with an excellent record building up a plant and making it pay. Address Box 713, care of Rock Products, 205 W. Wacker Drive, Chicago, Illinois.

WANTED—POSITION AS SUPERINTENDent of Lime Plant or Stone Quarry. Young man, college education, ten years' experience in modern lime plant. Reference on request. Address Box No. 765, Rock Products, 205 W. Wacker Drive, Chicago, Illinois.

CEMENT CHEMIST—12 YEARS IN MODern mills. Experienced in inorganic chemistry and physical testing, grey, mortor and high early strength cements. Research in burning, grinding and filtering. 2 years college. Excellent references. Desire position as chief chemist or analyst. Address box 782, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

FIRST CLASS, HIGHLY CAPABLE OFfice man with A-1 references wishes position with responsible Limestone Company where real ability, loyalty and conscientious effort will be recognized. Address Box 781, care Rock Products, 205 W. Wacker Dr., Chicago, Ill.

POSITIONS VACANT

QUARRY SUPERINTENDENT—Wanted; for 500,000 tons annual Crusher production. Required: Active and ambitious man with experience for steam, electric, and gasoline equipment. Applicant must be well qualified for successful planning of operation and leadership for labor organization. Apply Box 779, care Rock Products, 205 W Wacker Drive, Chicago, Ill.

SCHOOLS

LEARN MARBLEIZING

and porcelain enameling. With vitreous cement mix with water, apply over anything, with brush, trowel, spray. Produces snow-white, high glossy porcelain finish, any color. For casts, statues, building work, no limit. Is wonderful. Send dime for assorted samples, including rubber mold making. **COWELL INSTITUTE, Grayling, Mich.**

CONSULTING ENGINEERS

H. J. BROWN

CONSULTING ENGINEER
35 Deane Street, Boston, Massachusetts
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

Consultation **Design**
Examinations **Construction**
Reports **Supervision**

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

H. D. RUHM

Consulting Engineer
PHOSPHATE LANDS
grades of rock.
10-mesh PHOSPHATE FILLER, $8.00 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
705 West Seventh St., Columbia, Tennessee

BUSINESS OPPORTUNITIES

FOR SALE OR LEASE

A quarry in N. Y. state with 1000 ton daily crushing plant. Ample material supply. It has good possibilities for active party. Reply to M. C. E., care of Rock Products, 205 W. Wacker Drive, Chicago, Illinois.

LIQUIDATION SALE

Sand and Gravel Deposit

200 Acres Land containing 100 acres sand and gravel. 70 ft. deep. Fully developed. Material excellent quality. Located on railroad in center of large Cleveland, Akron and Youngstown markets. Low freight rates.

Property can be bought at less than farm land price to liquidate company.

E. E. KLOOZ
1313 Mahoning Bank Bldg.
Youngstown, Ohio

SAND FOR SALE

99 per cent pure silica, in hills. 300 acres, estimated 15 million yards. On Atlantic Coast Line siding.

W. W. PACE
Albany, Georgia

FOR SALE

Complete stone crushing plant

Very large jaw crusher, gyratory crusher, vibrating screen, motor, elevator shovels, crane, compressors, tools, truck scale, pumps, cars, track.

EQUITY EQUIPMENT CORP.
41 Park Row, N. Y. **Tel. Cort. 7-1250**

Classified Ads—$4.00 per column inch. Positions or Help Wanted—$1.00 per column inch, payable in advance.

RUBBER RIDES THE RAILS

As Well As The Highways

A typical example of Goodrich product development

A FEW short years ago, railroads faced a real problem. Speed was the demand of the times—but extreme train speed brought quick wear, vibration, noise.

But railroad engineers were at work. They called on the metallurgists for more alloys, and on Goodrich for new rubber properties.

Goodrich was ready. Sixty-five years of research could now be applied to railroad problems.

Rubber center plates were developed to reduce transfer of noise and vibration from trucks to body. Side-sway on curves was steadied by rubber side bearings. Special rubber strips were made to insulate cars against heat, noise and dirt. Motors and air-conditioning mechanism were mounted on rubber to isolate the body against vibration.

More recently rubber tie plates have been developed to reduce shock caused by rail joints and cross-overs.

The result of such development is the quiet, speedy train of today—rejuvenating rail travel, setting new speed records, reviving the railroads' place in the sun. Goodrich improvements in rubber played their important part in making this modern marvel practical—just as Goodrich improvements in belting, hose and other rubber products have brought increased efficiency and greater economy to industry. The B. F. Goodrich Company, Akron, Ohio.

Goodrich

ALL *product problems* IN RUBBER

Another story of Goodrich development work appears on Page 3

Frequent Rope Replacements Cut Down Production . . .

Rope replacement means more than just the cost of a new rope. It means lost production as well. And the value of this lost production is directly chargeable to the rope. That is one of the things that makes some ropes really costly.

TRU-LAY Preformed aids production by lasting longer and reducing shut-downs. Furthermore, TRU-LAY, is easier to handle and therefore faster to reeve. It resists fatigue, kinking, and spools perfectly on the drum.

During the last thirteen years TRU-LAY Preformed wire rope sales have increased amazingly because more and more operators have found it lasts longer and, therefore, boosts production. American Cable pioneered in the development and perfection of preformed wire rope.

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE COMPANY, Inc.
WILKES-BARRE, PENNSYLVANIA
District Offices: Atlanta, Chicago, Detroit, Denver, New York, Philadelphia, Pittsburgh, Houston, San Francisco

In Business for Your Safety

A FEW OF THE 137 AMERICAN CHAIN & CABLE INDUSTRIAL PRODUCTS

AMERICAN CHAIN DIVISION
(DOMINION CHAIN COMPANY, Ltd., in Canada)
Weed Tire Chains • Welded and Weldless Chain • Malleable Castings • Railroad Specialties

AMERICAN CABLE DIVISION
Tru-Lay Preformed Wire Rope • Tru-Loc Processed Fittings • Crescent Brand Wire Rope Tru-Stop Brakes

ANDREW C. CAMPBELL DIVISION
Abrasive Cutting Machines • Floformers Special Machinery • Nibbling Machines

FORD CHAIN BLOCK DIVISION
Chain Hoists • Trolleys

HIGHLAND IRON & STEEL DIVISION
Wrought Iron Bars and Shapes

MANLEY MANUFACTURING DIVISION
Automotive Service Station Equipment

OWEN SILENT SPRING COMPANY, Inc.
Owen Cushion and Mattress Spring Centers

PAGE STEEL AND WIRE DIVISION
Page Fence • Wire and Rod Products Traffic Tape • Welding Wire

READING-PRATT & CADY DIVISION
Valves • Electric Steel Fittings

READING STEEL CASTING DIVISION
Electric Steel Castings, Rough or Machined

WRIGHT MANUFACTURING DIVISION
Chain Hoists • Electric Hoists and Cranes

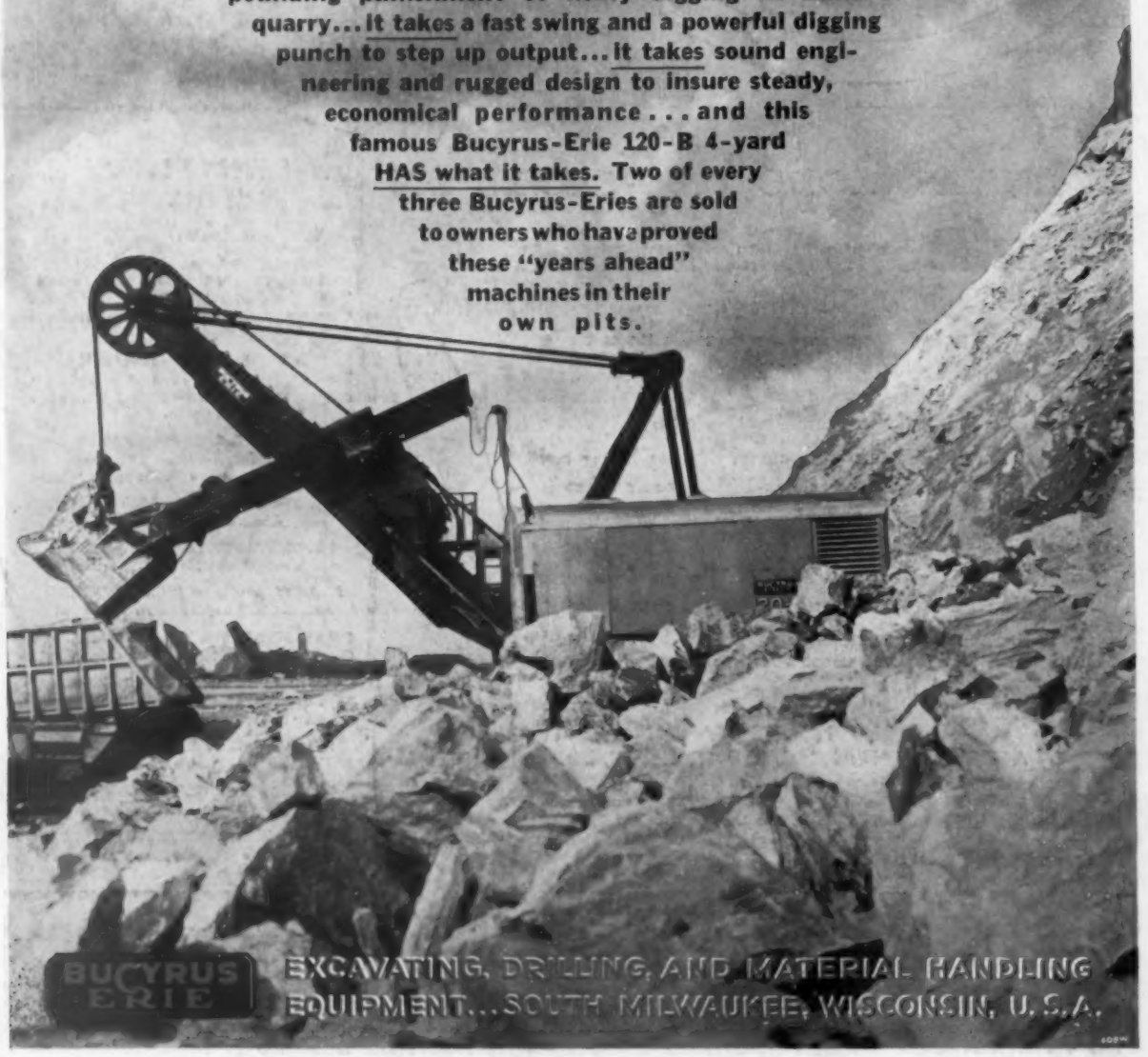
TRU-LAY *Preformed* WIRE ROPE

ALL AMERICAN CABLE DIVISION ROPES MADE OF IMPROVED PLOW STEEL ARE IDENTIFIED BY THE EMERALD STRAND

BUCYRUS-ERIE

In tough digging » »

It takes a time-tested, job proven shovel to stand up to the pounding punishment of heavy digging in mine or quarry... it takes a fast swing and a powerful digging punch to step up output... it takes sound engineering and rugged design to insure steady, economical performance . . . and this famous Bucyrus-Erie 120-B 4-yard HAS what it takes. Two of every three Bucyrus-Eries are sold to owners who have proved these "years ahead" machines in their own pits.



BUCYRUS ERIE

EXCAVATING, DRILLING, AND MATERIAL HANDLING EQUIPMENT... SOUTH MILWAUKEE, WISCONSIN, U. S. A.